DOCUMENT RESUME

ED 128 249 SO 009 317

| | |
|---|---|
| TITLE | Geography and Educational Media: Topics in Geography, Number 3. |
| INSTITUTION | National Council for Geographic Education. |
| PUB DATE | May 67 |
| NOTE | 66p.; For related documents, see SO 009 315 and 316 |
| AVAILABLE FROM | NCGE Central Office, 115 North Marion Street, Oak Park, Illinois 60301 ($1.00) |
| EDRS PRICE | MF-$0.83 Plus Postage. HC Not Available from EDRS. |
| DESCRIPTORS | Curriculum Development; *Curriculum Enrichment; *Educational Resources; Elementary Secondary Education; Geographic Concepts; Geography; *Geography Instruction; Instructional Aids; Instructional Materials Centers; *Instructional Media; Social Studies; *Teaching Techniques |

ABSTRACT

This collection of articles is designed to acquaint elementary and secondary school teachers with new educational media and with effective uses of old media. Two articles discuss the media concept and its appropriateness to the study of geography. In several articles, commonly used materials such as wall maps, globes, and elements of the classroom are described and suggestions for their use are given. The still photograph, if clear and forceful, is shown to supplement map and globe studies. Road maps are recommended to facilitate understanding of orientation and scale concepts in lower grades, while concepts of population distribution and topography can be reinforced in upper grades by using overlays on an overhead projector. Following these articles is a description of one innovation in curriculum resource development employing the audio-tutorial approach in which the student interacts individually with learning materials. Next are four short selections in which teachers share some innovative ideas for media use that have been used successfully in their own classrooms. The final two articles present listings of source information on media articles and instructional materials and techniques. (AV)

**********
* Documents acquired by ERIC include many informal unpublished *
* materials not available from other sources. ERIC makes every effort *
* to obtain the best copy available. Nevertheless, items of marginal *
* reproducibility are often encountered and this affects the quality *
* of the microfiche and hardcopy reproductions ERIC makes available *
* via the ERIC Document Reproduction Service (EDRS). EDRS is not *
* responsible for the quality of the original document. Reproductions *
* supplied by EDRS are the best that can be made from the original. *
**********

ED128249

# TOPICS IN GEOGRAPHY
## Number 3

U.S. DEPARTMENT OF HEALTH, EDUCATION & WELFARE
NATIONAL INSTITUTE OF EDUCATION

THIS DOCUMENT HAS BEEN REPRODUCED EXACTLY AS RECEIVED FROM THE PERSON OR ORGANIZATION ORIGINATING IT. POINTS OF VIEW OR OPINIONS STATED DO NOT NECESSARILY REPRESENT OFFICIAL NATIONAL INSTITUTE OF EDUCATION POSITION OR POLICY

"PERMISSION TO REPRODUCE THIS COPYRIGHTED MATERIAL BY MICROFICHE ONLY HAS BEEN GRANTED BY
NCGE
TO ERIC AND ORGANIZATIONS OPERATING UNDER AGREEMENTS WITH THE NATIONAL INSTITUTE OF EDUCATION FURTHER REPRODUCTION OUTSIDE THE ERIC SYSTEM REQUIRES PERMISSION OF THE COPYRIGHT OWNER"

SP 009317

National Council for Geographic Education

2

# TOPICS IN GEOGRAPHY
## Number 3

# GEOGRAPHY AND EDUCATIONAL MEDIA

National Council for Geographic Education
Illinois State University
Normal, Illinois 61761

TOPICS IN GEOGRAPHY SERIES

Number 3

Geography and Educational Media

The articles in this booklet on "Geography and Educational Media" are reprints from the May 1967 issue of *The Journal of Geography*. These articles were planned and solicited by Allen A. Schmieder, Chief of the Social Science Branch of the Division of Educational Personnel Training in the United States Office of Education.

The prime purposes of this publication are to acquaint teachers with new educational media and with effective uses of old media.

Allen A. Schmieder and Herbert H. Gross, Editor of *The Journal of Geography*, cooperated in the editing of the papers and in the structuring of the publication.

The Publications Center of the National Council for Geographic Education is grateful for the opportunity to reprint "Geography and Educational Media."

May, 1967

Kermit M. Laidig
Director of Publications

# TABLE OF CONTENTS


- Geography and Educational Media
  Allen A. Schmieder and Salvatore J. Natoli ..... 4
- The Media Specialist in Geography Education
  John Barson ..... 5
- A Geographer Looks at the Media Concept
  Paul F. Griffin ..... 6
- Media Available Within the Local Environment
  Charles F. Gritzner and Philip B. Larimore ..... 7
- Inquiry Through Comparative Map Analysis
  Peter V. Greco ..... 11
- Globes for Classroom Use
  Herbert H. Gross ..... 16
- The Still Picture in Geography Instruction
  Paul F. Griffin and Ronald L. Chatham ..... 20
- A Road Map to Geography
  George Vuicich ..... 29
- Overhead Transparencies for the Upper Grades
  Robert E. Gabler ..... 32
- Utilizing the Audio-Tutorial Approach
  Richard Beckman, Robert Janke, and Gilbert Tanner ..... 39
- Color Lifts
  Thomas G. Gault ..... 44
- Homemade Movies in the Classroom
  Mary Ellen Kolka ..... 46
- Aerial Photographs in Secondary Schools
  Richard Silvernail ..... 48
- Use of the Gemini Slides
  Wayne R. White ..... 51
- Quality Control in Graphics
  Philip B. Larimore ..... 53
- Bibliography of *Journal* Articles on Educational Media 1956-1966
  Salvatore J. Natoli ..... 56
- Sources of Information on Educational Media
  Alfreda M. Liebermann ..... 61


Photo credits: page 20, National Publicity Studios, New Zealand; page 21, Oregon State Highway; page 22, Cominco; page 23, Bord Failte; page 24, Rob Wright

# Geography and Educational Media

Allen A. Schmieder
Salvatore J. Natoli

Historically, education has not been characterized by technical innovation. Instruction has generally depended heavily upon verbal expression. In the last decade, however, technology has become an increasingly important part of educational strategies. Today, the classroom teacher has available an array of materials, equipment, and systems which are intended to make him a more effective communicator of knowledge. Closed-circuit television, multi-topic transparency series, word slides, single concept loop films, programed learning, product lines, and audio-tutorial facilities are becoming part of the common schoolroom operation.

This great expansion in educational media has resulted in a reexamination of the learning process. Verbal understanding is more than ever before being reinforced with visual conceptualization. The teacher is not only faced with a wide choice of literature and curriculum materials but has also been buried by a veritable landslide of educational hardware. The challenge of fusing these new media properly into geographic education is a great one.

Fortunately, the geography teacher has a broad base to build upon in the use of educational media. Few subjects have such a rich tradition of audio-visual utilization. Throughout the history of American education, the geographer has assumed responsibility for globes and maps as communicative media and, to a lesser degree, photographs and slides.

This special issue of the *Journal* introduces some of the new media, but it is primarily concerned with helping elementary and secondary school teachers to rediscover and to use more effectively some of the "old media." The contributions are generally from college faculty members who have had significant and successful experiences in dealing directly with the problems of the classroom teacher. The examples of media-geography integration were selected because they present strategies which can easily be adapted for classroom use. Further, these approaches largely use materials which are common to classrooms or which can be acquired at a reasonable cost.

There is an intended logic to the sequence in which the articles are presented. The first two are brief presentations in which the authors, a geographer with an interest in educational media and a media specialist with an interest in geography, discuss generally the media concept. The next three articles consider the most commonly used media within the reach of almost every teacher—the home environment, wall maps, and globes. The subsequent three pieces and the article preceding the bibliographies deal with materials which are not unknown in most classrooms—still pictures, road maps, and overlays. Following these is a discussion of the nature of audio-tutorial programs which are representative of multi-media approaches to learning.

Next are four short selections in which contributors share some ideas that have

ALLEN A. SCHMIEDER is the Chief of the Social Sciences Branch of the Division of Educational Personnel Training in the United States Office of Education, Washington, D.C. 20202. He is a member of the Executive Board of the National Council for Geographic Education and is a member of the AAG-NCGE Joint Committee on Education. A biographical statement on Salvatore J. Natoli is on page 56.

been used successfully in their own classrooms. The final two articles will help to locate additional information on particular educational media subjects and approaches. The first is a bibliography which includes references to all educational media articles printed in the *Journal* over the last decade. These article cover a great variety of geography topics and provide a broad catalogue of media concepts. The second is a selected list of general sources of information on instructional materials and techniques.

If you have questions about the use of educational media in geographic education, contact: (1) the appropriate state coordinator of the National Council for Geographic Education (listed in the April issue of the *Journal*), (2) the Audio-Visual Committee of the National Council for Geographic Education, or (3) the educational media specialist in your school or college.

# The Media Specialist in Geography Education

John Barson

The needs of those teaching geography in colleges and schools present a unique challenge to the media or audio-visual specialist. Geography education is essentially characterized by a heavy investment in visual materials, models, globes, maps, pictures, and other representational forms. In his work with other substantive fields the media man seldom encounters such an abundance of materials. His usual job consists of correcting deficiencies in instructional materials and creating new materials to fill gaps. But in the case of geography, his "clients," the geographers, are already well-equipped and media-conscious. Nonetheless, there are a number of ways media specialists can provide help.

For instance, the astute media specialist discerns that a good number of materials in geography serve better to document the facts of the field than to instruct the learner, especially if the learner lacks the "code" to interpret this information. Broad experiences with graphics design and instructional materials usage makes the media specialist a valuable ally to the geographer who wishes to improve the quality of communication in his subject.

A second major way the media specialist can aid is to serve as an information source for geography instructors who wish to obtain instructional media from commercial and/or specialized private collections. The broad teaching materials enterprise that has developed in the last decade makes it exceedingly difficult for the teacher or scholar to keep abreast of the plethora of catalogs and listings of newer media and media devices. The size of the task justifies the assistance of the media specialist.

It should be noted that the media specialist is not qualified to judge material content quality. This task remains the collective responsibility of the geographer and his colleagues.

The third and perhaps most important role the media person should play is the dissemination of techniques in in-

JOHN BARSON is presently the director of the Instructional System Development Project at Michigan State University, East Lansing, 48823. This USOE sponsored study is examining the utilization of the newer media in courses of instruction in higher education. He has been director of special media institutes for directors of NDEA, Title XI, geography institutes for the past two years.

structional media and development and utilization. This is no simple job, since few absolute principles of operation apply and the variables that can interfere are numerous.

Nonetheless, cases of successful media innovation are occurring daily in all fields and each has a lesson to offer. With a few modifications there is little reason why the success experienced by other disciplines in using 8mm motion picture cartridges, animated transparency materials, instant copy methods, and other new media technologies cannot be put to work in geography

The teaming of geographers and media specialists in attacking instructional problems can be a boon to learners in college, secondary schools, and all down the line wherever geography is taught.

# A Geographer Looks at the Media Concept

Paul F. Griffin

Geography is a field of knowledge which lends itself well to the use of audio-visual media. The reality of the earth's surface—its physical and cultural elements—traditionally has been conveyed to students through direct field experiences and through the use of globes, maps, films and filmstrips, slides, models, and other such instructional materials.

The space-age world demands that we gear our thinking to the technological society man has created. Technology (a Greek word for a bag of tools) has revolutionized man's concept of his world. For example, man's concept of the earth has progressed from the flat wafer-disc world of the Homeric Era through the Mercator World, the Ocean Basin World, and the Air Age World to the new frontiers of rockets and satellites.

Remote sensing, satellite information, computer storage and retrieval, and transfer of data through quantitative analysis, and other such recent innovations have all resulted in a fund of material so overwhelming that the geography teacher can scarcely keep pace with this knowledge explosion.

In meeting this challenge, the teacher is faced with the dual task of not only selecting the most worthwhile concepts but of also determining the most effective means of communicating them to the students. With such a large body of unschooled students and with such a gigantic increase in the materials to be handled, the teachers' task is even more difficult. Caution must be exercised in the selection of materials to be taught and a better way of presenting this knowledge must be found. The new media offer at least a partial solution to this problem, providing they are carefully selected and used to present the most abstract concepts of the discipline. A good transparency, aerial photo, single concept film, or other such medium not only increases the possibility of covering more subject matter but also enhances the learning process.

PAUL F. GRIFFIN is chairman of the department of geography at the Oregon College of Education, Monmouth 97361. He was the geography consultant to the 1966 and 1967 Michigan State University Educational Media Institutes for directors of Title XI NDEA geography programs. Additional biographical details are given on page 20.

# Media Available Within the Local Environment

Charles F. Gritzner
Philip B. Larimore

Media, as here considered, pertain to any means of conveying knowledge to students through utilizing any one or a combination of the five senses. The teacher who seeks to enliven and enrich classroom instruction through the use of media often needs look no further than the local environment for inspiration and help. Unfortunately, the wealth of teaching aids and opportunities available in the home community is often overlooked by teachers who, in the face of an ever-increasing bombardment of commercial materials, equipment, techniques, and other concomitants of the "media explosion," seek mass-produced media answers to tailor-made questions, interests, and problems.

Many of the new media are ideally suited in quality, content, and applicability to individual classroom instructional needs. These aids should be used, by all means, when available. On the other hand, the teacher who feels confined when using mass-produced media or as the case may be, finds much of the commercial material to be lacking in content and validity, need not revert to conventional means of oral instruction with little or no use of media. The same applies to teachers in schools with limited budgets for the purchase of equipment and visuals, where a lack of trained personnel makes it difficult or impossible to prepare the more elaborate types of visual materials, or where inadequate physical facilities (lighting, ventilation, seating arrangement, space for screens or bulletin boards, etc.) limit the potential use of instructional media.

The creative teacher will find it relatively easy and highly rewarding to provide primary learning experiences for pupils, through direct or indirect contact with real-life situations, within the local region. Pedagogists have long known that the more direct the learning experience, the more meaningful it will be in terms of ego-identification with the experience; and that the greater the variety of senses through which information is channeled, the more profound and lasting will be the educational impact. Geography *is*. As teachers, we share the responsibility of making this geographic reality come to life in the minds of students. The selective use of local media can assist us greatly in the task of mak-

CHARLES F. GRITZNER and PHILIP B. LARIMORE are instructors in the department of geography and anthropology, Louisiana State University, Baton Rouge 70803. Both are active in the field of media and geographic education. Mr. Gritzner is chairman of the NCGE Committee on Audio-Visual Education. Mr. Larimore is director of the Cartography-Media Laboratory, School of Geology, LSU. This is their third co-authored paper on a media topic.

ing geography "a light in the mind, rather than a load on the memory."

## IMPROVING THE USE OF "OLD" MEDIA

The greatest amount of care and attention should be focused on the proper use of conventional teaching media. No amount of new media used in a classroom can compensate for poor employment of the traditional teaching methods. Some suggestions (many of which may appear naive owing to their obvious nature) include:

1. *Oral presentation.* Depart whenever possible from the purely lecture method of instruction; increase student response and involvement; substitute pictures or other visuals for words when possible; and consider the use of guest speakers—they can provide a highly informative change-of-pace.

2) *The chalkboard.* Of all conventional media, the chalkboard is generally used with the least imagination. Possibilities for enhancing its use include the use of colored chalk (if the composition of the board will allow it); the tracing of maps, block diagrams, or other features on the board with chalk (or hard pencil for permanence) following the outline of projected images (using the slide, overhead, or opaque projector); the drawing of block diagrams and other three-dimensional features; and using parallel lines (easily made with multi-chalk holders available in most music departments) for graphs, scale, and elevational differences.

3) *Bulletin boards.* The use of dry-mounting and lamination (spray or stick-on), manipulative,[1] felt, and magnetic bulletin boards, maps in association with other display materials, and pictures of great variety, can all enhance the quality of bulletin board displays. Careful attention should be paid to the composition of bulletin boards.

4) *Maps and globes.* Maps and globes should be carefully selected for *specific* purposes. The entire story of geography cannot be told from a single Mercator political map. Use a variety of maps and projections. Manipulative maps[2] can provide a degree of flexibility not otherwise available through the use of commercial products. When possible, use more than one map at a time to develop the concept of interrelationships. A globe prominently displayed will serve to remind students that the maps they use are simply representations of the spherical earth. The use of free service station maps of the home state or city can serve the dual purpose of teaching map reading while learning spatial relationships within the immediate environment. (Remember, service station maps are the only type which the majority of Americans ever use.) The comparison of maps with aerial photographs or the making of maps from air photos (the image being projected on the chalkboard or heavy paper) can make maps meaningful to students. Provide exercises with the topographic map of the local area. They will not only develop a better understanding of local physical and cultural patterns, but also teach the basic skills of mapreading.

5) *Books.* State or local laws may limit the flexibility of textbook selection. This should not, however, limit the use of paperback books or other inexpensive supplemental readings or prevent full use of the school's library resources. A textbook should never be considered the outer limit of inquiry into a region or topic.

[1] Philip B. Larimore and Charles F. Gritzner, "Creating Visual Impressions: Using Media in Geography Teaching," *Audiovisual Instruction* XI, 5 (May 1966), 349-352.

[2] *Ibid.*

## THE OPPORTUNITY AFFORDED BY "NEW" MEDIA

An in-depth consideration of "new" media lies outside the scope of this paper. Nonetheless, the variety of teaching aids and opportunities they afford should be investigated by all teachers, supervisors, and administrators. Far too often, the most enthusiastic teacher is discouraged by the lack of equipment (". . . two overhead projectors and one filmstrip/slide projector for all twelve teachers . . .", etc.) or by the time and trouble involved in scheduling equipment, setting it up for use, darkening the classroom while maintaining adequate ventilation, and by other strictly mechanical problems. As a minimum requirement, all classrooms should be equipped with a permanent screen and overhead projector and have a projection cart which can, with little effort, be rolled into place for film, filmstrip, or slide showing.

The greatest degree of flexibility offered by the "new" media is found in the overhead projector. It can be used to show transparencies in black, color, or multi-color (permanent or temporary); step-by-step, concept-building overlays; color lifts of some photographs; and opaque objects. One should not overlook the variety of possibilities offered by 35mm slides and 8mm or 16 mm motion pictures. Each medium affords the teacher a means of preparing visuals to suit specific individual instructional needs. The impact on pupils of homemade visuals, prepared by the teacher for a specific purpose, is frequently greater than that of commercially prepared media.

## LOCAL MEDIA RESOURCES

The variety and nature of teaching resources available within the home environment will vary depending upon geographic location, the season of the year, the size of the community, the local economy, and the grade level(s) taught. Space limitations will allow only a limited number of suggestions to be made. It is hoped, however, that these will open the door to implementation, as well as hint at other possibilities for utilizing local media sources.

### Field Trips

The field is the ultimate geographic laboratory. Globes, maps, models, pictures—all other media—are nothing more than attempts to reconstruct the reality of the earth's physical and cultural environments. Every possible effort should be made to provide students with field study experience.

Depending on circumstances, field trips may be conducted in a number of ways—in large groups (travel being by bus rather than in a number of automobiles to insure all students equal opportunity to benefit from observations and comments), in small groups, as individuals (each student being provided with a particular assignment, followed by classroom correlation of their observations), or the teacher can bring the field to the classroom through the use of slides, photographs, or homemade films. Regardless of the method used, careful attention must be given to thorough pre-trip briefing ("what you will see, and why"); students should be provided with a map or maps of the area to be traversed; and, depending on the nature of the trip and the grade level for which it will be conducted, a work-sheet should be provided keying students to a number of geographic factors they should look for and "discover" on their own. During the trip, the teacher or other source personnel should provide the necessary narration and explanation to make it a meaningful experience. A post-trip summary, perhaps with individual assignments, will serve to bring into focus the geographic elements observed. One of

the greatest benefits of field trips is to provide pupils with the skills needed to form their own interpretations and analyses of geographical phenomena.

With few exceptions, it is safe to assume that students don't know as much about local conditions as they think they do. Local industries, agricultural pursuits, and other enterprises are often overlooked entirely, simply because it is assumed that they are understood. As a minimal requirement of good citizenship, all students should have a sound basic understanding of all facets of the local economy. This understanding can best be provided by actual site visits.[3]

Various local, state, or federal agencies, which often have research stations, case-study models, or other resources of interest to students, include the U. S. Weather Bureau, U. S. Forest Service, Soil Conservation Service, U. S. Geological Survey, U. S. Department of Interior, county agents, and urban, city, or regional planning agencies (the latter constituting a particularly important source of information regarding population and economic growth, transportation networks, and landuse, of the community).

A gravel or sand pit serves as an excellent site for studying geomorphology on a micro-scale. If water is running, it is often possible to see landforms resulting from fluvial processes and water erosion being created in rapid sequence. Supermarkets provide an ideal laboratory in which to study economic and transportation geography. By reading labels, students can learn the source of various commodities. Problems of seasonality, preservation of perishables, supply and demand, and transportation can be discussed in the classroom, perhaps with the store manager or buyer as a speaker-guest. Museums, parks, monuments, outstanding local points of interest—all should be visited and understood by students.

### Speakers

Guest speakers furnish an informative change-of-pace in instruction. If carefully selected, they can often add a great deal to the understanding of local geography. Possibilities include the local television weather forecaster, representatives of government agencies, spokesmen for local industries, buyers for local chain stores, geographers from nearby colleges or universities, and district representatives of media-producing companies.

## CONCLUSION

There are many benefits to be derived from utilizing local media resources to their utmost. Their exploitation provides for variety in classroom presentation—that needed change-of-pace that holds and accentuates student interest. It provides a better understanding of local geographical patterns and, of paramount significance, geography "comes alive." It becomes a reality in the mind's eye, rather than an abstract exercise in memorizing information totally remote from everyday life.

[3] Two pamphlets which contain many excellent suggestions for the teacher seeking to enrich students' understanding of the local environment are: Herbert H. Gross, *The Home Community*, National Council for Geographic Education "Do It This Way" Series, (N. C. G. E., Illinois State University, Normal, Illinois 61761), $1.00; D. J. Whitener, *Local History, How to Find and Write It*, 1955 (Western North Carolina Historical Association, 3 Lorraine Avenue, Asheville, N. C. 28804), $ .75.

# Inquiry Through Comparative Map Analysis

Peter V. Greco

## Learning

Learning involves coming to terms with reality, investing the profusion of elements external to ourselves with meaning. This presumes some awareness of what distinguishes one thing from another or gives it definition. In addition, however, if learning is to be something more than a medley of terms, it must assert functional relations between and among notions. It must attend to the *processes* which in *time* and *space* interlink them. To be effective then, learning requires knowledge of processes operating systematically in time and in various parts of space.

In order to communicate relationships between and among things, we use words, both written and spoken, mathematical notation, and graphics. To be sure, in any effective scheme of learning these media are themselves related so that they complement one another's strengths. This article, however, is focused upon the spatial dimensions of natural and cultural processes graphically expressed via the map.

## Maps, Mapping and Map Reading

The things we observe—natural and cultural—exist in a world of space. These are physical occurrences, the living phenomena of the plant and animal worlds, and man and his creations. All are directly or indirectly observable as they relate to earth space, whether they be obvious elements of our day-to-day existence or more remote things like popular attitudes of yesteryear. No two things, however, are completely alike. Whatever the medium of communication—words, numbers, graphic expression—we find it necessary to select certain facets of a phenomenon to characterize the whole. This is a kind of generalization. By means of it we are able to group disparate elements into types and, unencumbered by other details in which we are not interested, to seek functional relationships with other phenomena similarly generalized. Thus when one uses a word or a number or a map to represent an area in which corn is grown as "a cornfield," he classifies an area on the basis of his principal concern even though, for example, weeds might be more numerous or a clean-tilled surface might be more extensive. And, on the assumption that there is a certain detectable logic in nature and in the ways of men, he hypothesizes relationships between the cornfield and other generalized phenomena and seeks to explain them by natural and cultural processes.

Peter V. Greco is an assistant professor of education and geography at Syracuse University, Syracuse, N.Y. 13210. He has done work in geography and social studies education on the secondary and university levels. Dr. Greco is secretary of the National Council for Geographic Education.

The map is a means to this end. Through a special language it expresses generalized sets of elements so that relationships between and among them can be discovered. The extensive literature on map reading, then, must be viewed as serving map interpretation rather than as an end in itself. Certainly, there must be training in the language of the map so that symbols are correlated with objective referents rather than with words alone. But teachers know that inventories of locations just like series of dates are sterile without attention to the processes that illuminate their significance and relate them to one another. Furthermore, evidence implies that highly-trained map readers do not perform significantly better than moderately trained ones.[1]

### Maps in Education

Interpreting maps presumes background knowledge. On the elementary level, then, one is well-advised to combine neighborhood and community studies with map interpretation. The locale is familiar to the child and the instructor elicits his reasons for the commonplace. While they are probably quite unsystematic and only moderately analytic, learning can progress from the known (however superficial) to the unknown. New sets of understandings, attitudes, and skills are critically examined by and with the learner in the light of what he has learned before, and learning becomes consistent and mutually supportive.

Soon, however, curriculum organization requires that the child be drawn to new horizons well beyond the nearby and familiar and frequently to exotic lands where wholly new natural and cultural elements exist and have their own unique explanations for being. Here, beyond the real experience, media including maps make their contribution. Although the satisfactions of map interpretation illuminated by real experience cannot be foresworn, efficiency calls for the use of vicarious experience to extend the learner's observations beyond the immediate. Therefore, maps of more distant places will be useful media in proportion to how readily they can be translated into and related to new visual images.

### "Nature" versus "Nurture"

Learning theorists have debated whether the development of perception and judgment in children stems principally from the inventions of the maturing individual or from his culturally-transmitted skills and experiences. Cogent arguments on either side suggest that both factors are important, although Piaget's and Bruner's insistence on the latter has given impetus to the inclusion of more varied and sophisticated experiences in the primary grades.[2]

Evidence exists that the child can contend with more experience with materials that call for part-whole integrations—the relational scheme by which mapped generalizations, for one, are synthesized. While studies show a positive correlation between increasing age and ability to perceive parts first and then parts and wholes, it has been demonstrated that by age nine three out of four children can satisfactorily achieve part-whole

[1] H. McCarty and N. Salisbury, *Visual Comparison of Isopleth Maps as a Means of Determining Correlations between Spatially Distributed Phenomena,* State University of Iowa Studies in Geography No. 3 (Iowa City: The Department of Geography, 1961), p. 30.

[2] J. Getzels and K. Elkins, "Perceptual and Cognitive Development: Perception in Space and Perception of Form," *Review of Educational Research,* XXXIV (December 1964) 563, 566; E. Peel,, "Experimental Examination of Some of Piaget's Schemata Concerning Children's Perception and Thinking and Discussion of Their Educational Significance," *British Journal of Educational Psychology,* XXIX (June 1959), 100.

integrations.[3] Another investigation amplifies on this conclusion. In an interesting experiment that involved the combination of liquids from two of four beakers with that of a vial to produce a certain color, children between seven and eleven years of age consistently combined the contents of the vial with each of the beakers separately. At twelve years, children experimented with combining the vial with combinations of two beakers, and, even after having been successful in reproducing the desired color, they tried to determine whether the color could be produced from other possible combinations of two with the vial. From fourteen years, three-at-a-time combinations were tried even when success had already been achieved at the two-at-a-time level.[4] It would seem, then, that while proficiency in perception and systematic analysis certainly increases with age, classroom concern with relating mapped but unseen elements might be initiated earlier and extended to more sophisticated levels than much of the recent literature suggests.[5]

[3] D. Elkind, R. Koegler, and E. Go, "Studies in Perceptual Development: II Part-Whole Perception," *Child Development*, XXXIII (September 1962, 619-630, as reported in Getzels and Elkins, *Review of Educational Research*, p. 562.

[4] From the work of Piaget as reported by M. Wallach, "Research on Children's Thinking," in *Child Psychology*, ed., H. Stevenson, National Society for the Study of Education Yearbook No. 62, Part 1 (Chicago: The University of Chicago Press, 1963), p. 265.

[5] R. Heppell, "Some Map Concepts for High School Social Studies, *Social Studies*, XLVIII (November 1957), 249-252; L. Howitt, "Map in the Social Studies," *High Points*, XXXIX (November 1957), 73-78; E. Mitchell, "Introducing Maps: A Skill," *Childhood Education*, XXXVII (February 1961), 279-283; G. Whipple, *How to Introduce Maps and Globes*, National Council for the Social Studies, How To Do It Series (Washington: The Council, 1959); L. Witucki, "Skills and Processes in the Social Studies," in *Social Studies in the Elementary School*, ed. J. Michaelis, National Council for the Social Studies Yearbook No. 32 (Washington: The Council, 1962), pp. 196-205.

### Types of Maps

There are maps and there are maps. Some vie with restaurant place-mats in complex undigestible detail. Others, in the effort to provide on one map those generalized sets of phenomena that would make relationships apparent, run the risk of not being able to incorporate the variety of categories of elements that are especially significant in certain areas but not in others.[6] For this reason comparative wall maps are suggested so that pertinent generalized phenomena from several maps on the same locale can be explained analytically and synthesized in regional studies. The aim is not to use visual comparisons to show the *degree* of association between mapped phenomena but rather as a guide for geographic inquiry—a means by which a student can hypothesize relatedness between two or more of several alternative mapped sets and then summon scientific explanations for their apparent connection.[7] Comparative map analysis, then, is a basis for an open-ended "dialogue" between student and map all in full earshot of others in the classroom. Cloture comes when all functionally associated elements of places are asserted. And since systematic explanations for mapped phenomena require the consideration of other elements that might not be mapped, the inquiry is limited only by ignorance.

Of the commercially available comparative wall maps, the Philips' Series of Comparative Wall Atlases, World Scale,[8]

[6] McCarty and Salisbury, pp. 2-3.

[7] McCarty and Salisbury, p. 78.

[8] Density of Population (P9d) with Predominant World Economies (P79c); Climate-Northern Summer (P9s) with Climate-Northern Winter (P9w); Relief of Land (P9r) with Annual Rainfall (P9o); Soils (P79s) with Natural Vegetation (P9v). Double-mounted as indicated on Mounting No. 24 and available through the Denoyer-Geppert Company, 5235 Ravenswood Avenue, Chicago, Illinois 60640.

is recommended. Like the Rand McNally wall map versions of world distributions found in *Goode's World Atlas,* they each throw into bold relief a single generalized phenomenon which on a more detailed map might be obscured. What distinguishes Philips from Goode (and the Philips' continental maps as well) is their relatively small number of categories of phenomena which are widely explained in existing texts and which produce patterns that are larger and more easily compared with other mapped elements.[9] To the writer, this characteristic more than offsets Philips' use of stereographic projection which, unlike Goode's homolosine projection, does not provide equal area maps. On sixteen linear feet of map molding, eight double-mounted Philips' maps replicate for a class what amounts to an atlas with pages torn out and magnified. Thus presented, they make for a synoptic view of varieties of distributions which can then be analyzed and interconnected after the way of the geographers and in the best tradition of inquiry.

### Principles of Map Use

Teachers know that an important condition of perception is the setting or situation in which perception occurs. The setting or situation could presumably be associated with a stimulus in the external world or it might be influenced by the mental set of the perceiver. Just as both have implications for advertisements and theatre settings, they have important suggestions for the creation of maps.[10] Since, however, this article deals with the use of available materials rather than their creation, it will be important for us to ask how these general conditions of perception relate to comparative map analysis.

The relations between and among elements in places are not always best conveyed through maps. Since we know that they are at times better asserted through the use of other graphic forms (such as diagrams, models, or still pictures) or numbers or words, there is obviously a need to complement map analysis and synthesis with vicarious experiences from other media.[11] Thus comparative analysis of maps of natural vegetation and soils and population density for the study of equatorial areas is made more meaningful by recourse to, say, the printed word in Hudson's *Green Mansions,* the encyclopedia under "rain-forest" or "latosol," the still pictures of a Pendleton, the moving pictures of a de Rochemont. By these means, perception is extended to remote vistas, there is understanding of unfamiliar processes, and the generalized phenomena of maps can be visualized and interrelated. In other words, the readiness of the child to perceive map patterns as generalizations is efficiently cared for by pictures of the phenomena being generalized; and his ability to relate such a spatial generalization to a similarly formed pattern on another map of the same locale is enhanced by some knowledge of the systematic process that explains why certain things tend to coexist areally or co-vary in space. In a sense, then, the teacher must be something of a magician by creating in his classes a readiness—an expectancy—with respect to what is likely to occur with, or as a result of, something else. To this end, two additional suggestions of psychologists are mentioned in conclusion: the use of redundant information markedly im-

[9] McCarty and Salisbury (pp. 9, 79) suggest that a student will be more successful in visual comparison of mapped distributions if they are divided into fewer class intervals and have fewer marked local contrasts.

[10] McCarty and Salisbury, pp. 78-79.

[11] W. Balchin, "Graphicacy Should be the Fourth Ace in the Pack," (*London*) *Times Educational Supplement,* (November 5, 1965), 947.

proves perception[12] and concentration on cores rather than peripheries reduces variation in the perception of areas.[13]

### Maps and Industry

Maps, then, can become a significant springboard for inquiry. The analysis of patterns and their synthesis to form regions is nothing more (or less) than the creation of an intellectual configuration from parts in operations that are logical in nature. And, after the flexibility for regional studies suggested in the literature, the initial inquiry might be varied so long as the development is not haphazard. In effect, then, the child should be able to use maps to formulate propositions that relate generalized phenomenon to generalized phenomenon and, with increasing sophistication through the grades, make logical linkages between propositions. This kind of thinking—"interpropositional," so-called—of a higher order than the younger child's achievements in classifying and seriating phenomena is nonetheless dependent upon it and can also be a predicted outcome of map interpretation.

[12] E. Gibson, "Perceptual Development," in *NSSE Yearbook* No. 62, Part I, pp. 144-195.
[13] M. Wallach, "Research on Children's Thinking," in *NSSE Yearbook* No. 62, Part I, pp. 236-276.

## TELE-LEARNING: EXCITING METHOD FOR COMMUNITY STUDY

Current technology makes it possible for elementary school pupils to study their home community, to make visual recordings of selected community elements, and to share this information with pupils at distant points. This kind of project was initiated when the fifth grade of the laboratory school at Concordia Teachers College, River Forest, Illinois, under the supervision of Margaret Kruse, and the fifth grade at Margaretville Central School, Margaretville, New York, under the supervision of Betty Martin, each studied its own community with the purpose of comunicating this information to the other class.

As a beginning step, the pupils exchanged picture postcards and letters in which they mentioned some things about their respective communities, described their school activities and personal interests, and gave the occupations of their fathers. The classes also exchanged local area maps and newspapers.

As a second step the pupils took representative pictures of selected aspects of their communities and had these developed into slides. The slides depicted the school setting, typical residences of the pupils' home community, contrasting residences of nearby communities, main business districts, selected industries, transportation routes, and physical features of the community. Each class selected the slides it wanted to exchange with the other class and arranged them into an order which would tell the community story. The set of slides developed by each group was exchanged.

Small groups within each class prepared talks on certain slides. As they were doing this, they found it necessary to gather additional information about their own community through resource persons and field trips.

At a pre-arranged time the fifth grade in River Forest, Illinois, placed the telephone call from their classroom to the fifth grade at Margaretville, New York. As the Margaretville class viewed the slides of the River Forest area, the fifth grade in River Forest told its story. Then the Margaretville fifth grade told its story while the River Forest fifth grade viewed the slides of the Margaretville area. The presentations lasted 45 minutes while the spontaneous questions-answers and the free conversation took 25 minutes. Some questions were asked and answered during the presentation.

Pupils of the two classes were able to engage easily in two-way conversation because of the telephone instrumentation which was used. Each small group of six pupils had a speaker-phone transmitter immediately available to it so that each pupil could speak from his own desk. The instrument is hands-free so that the pupil can take notes or hold his note pad. Speakers were arranged so that the voice volume would be distributed at a conversational level throughout the classrooms. The conversation took place over existing telephone circuits.

Worthwhile? Try it sometime.—Lloyd C. Foerster, Concordia Teachers College, River Forest, Ill.

# Globes for Classroom Use

Herbert H. Gross

Globes rank among the best of instructional media in geography. They serve admirably to demonstrate the following.

1. Shape of the earth
2. Size, shape, and relative location of land and water bodies
3. Hemispheres (north-south, east-west, land-water, daylight-darkness, yours-antipodal)
4. Grid of the earth
5. Directions
6. Distances (great circles)
7. Time (hours and days)
8. Earth as an astronomical body (Milky Way, solar system, earth-sun relations, earth-moon relations)
9. Satellite orbits
10. Relief and drainage pattern of the earth
11. Political pattern of the earth

The question teachers often ask is "What kind of a globe should I buy to demonstrate all of the things listed?" The answer obviously is, "No single globe will do the job." Globes are of great variety and quite specific in the services they can effectively render.

## GLOBES WITH RELATED EQUIPMENT

1. *Celestial globe.* A small globe is mounted inside of a hollow transparent sphere that shows the location of the stars. It can be set to show their positions in the sky at any time.

2. *Solar system.* The model of the solar system shows the size and position of the earth relative to the other planets.

3. *Planetarium.* This instrument was at one time called an orrery. Its basic function is to show earth-sun-moon relations. It serves admirably to demonstrate rotation (daylight and darkness), revolution (the season), eclipses, and phases of the moon.

4. *Map projection model.* The globe is transparent with a light in its center. The grid and surface features of the earth are projected onto flat, conical, and cylindrical surfaces to show basic map projections.

5. *Satellite globe.* The relationship of an orbiting satellite to a rotating globe can be demonstrated with this model.

HERBERT H. GROSS is editor of the JOURNAL OF GEOGRAPHY and professor of geography at Concordia Teachers College, River Forest, Illinois 60305. He served the National Council of Geographic Education as director of coordinators and as president. Dr. Gross is the senior author of a series of social studies books and has published articles in a variety of professional journals.

## SIZES OF GLOBES

Globes are available in many dimensions. Those most commonly used in the classrooms have 8-inch, 12-inch, and 16-inch diameters.

The 8-inch globe is designed primarily to serve individual students. The small size permits ease of manipulation. This globe has an approximate circumference of 25 inches, consequently each inch represents 1,000 miles. This is an obvious aid in making distance calculations.

The 12-inch globe has general classroom utility. The globes used in the primary grades ordinarily have this dimension.

The 16-inch globe is the most popular classroom globe. It is large, but not difficult to manipulate. Another favorable feature is its 50-inch circumference. Since the earth has an approximate circumference of 25,000 miles, each inch on the globe represents 500 miles. This feature permits rapid distance estimates.

## TYPES OF GLOBES

*Primary globes.* These globes ordinarily have a 12-inch diameter. Several distinctively different kinds are available. One kind accents the physical elements of the world with the political organization playing a secondary role. Another accents the political features. Primary globes carry a relatively small number of place names. The type conforms with that found in primary readers.

*Advanced globes.* These globes have either a 12-inch or a 16-inch diameter. Some are basically *political.* Their prime function is to show the pattern of nations and cities.

The *political-physical globes* have a political accent with some relief shown by shading. A variation of this kind of globe is an illuminated rendition which has a double layer of gores. The lower layer has the relief shading and the upper layer shows the political features. The shaded relief is visible only when the light is on.

The *physical-political globes* accent the physical features of the earth and the political elements perform a secondary role. Relief is usually represented by color layers and shading. At times a third dimension is added so that the relief can be felt as well as seen. Of course, the relief has to be exaggerated so that it can be made observable.

On some physical globes the color used is supposed to represent the appearance of the earth's surface when any particular part of the world has summer. Color elevation is sacrificed for air-view appearance.

The project globes ordinarily have a diameter greater than 16 inches. The larger ones are slated. Information of geographic value can be drawn on the surface with white or colored chalk. This information can range from the earth's grid to trade routes. Desk project globes are usually small. Ordinarily they are constructed so that crayon marks can be wiped off.

## MOUNTINGS OF GLOBES

1. *Cradle.* Some cradles serve no other purpose than to hold the globe in position. Some have pegs so that the globe can be rotated with a 23½° inclination. Some cradles are designed so that half of the globe is clearly visible above the structure. This kind of cradle makes possible lucid demonstrations of hemispheres and great circles. One kind of cradle globe has a hinged-horizon ring. This ring significantly augments the educational value of a cradle globe, since such things as the height of the noon sun at various seasons, the directions in which the sun rises and sets, and the number of hours of daylight and dark-

ness at the time of the equinoxes and solstices can readily be demonstrated.

2. *Fully-movable meridian.* The meridian frame of this kind of mounting is usually marked in degrees and miles. The inclination of the globe's axis can be altered.

3. *Semi-meridian.* In this mounting the globe remains fixed with a 23½° inclination. The globe can spin freely to demonstrate the earth's rotation and day and night.

4. *Adjustable.* Globes have been built by several companies that have adjustable mountings. An adjustable mounting increases the serviceability of a single globe, since a greater variety of things can be demonstrated with this kind of facility than with a fixed mounting.

## SUGGESTIONS

1. Any globe represents the spherical characteristic of the earth. However, for purposes of demonstrating the shape, it is probably best to have a globe that can be removed from the mounting. Furthermore, to show the relative size and distance of the moon, hold a tennis ball about 30 feet from a "free" 12-inch globe.

2. Size, shape, and relative location of land and water bodies are best shown with a "free" globe. Globes attached to mountings prevent easy manipulation.

To show relative size, cut the shape of the 48 states or India or Australia or any other nation from rubber sheeting. Obviously, the size must be identical to that on the globe. This cutout can be placed over any other part of the world.

3. Hemispheres are easily demonstrated with globes in cradle mountings that expose exactly half of the sphere. Some of the globes with adjustable mountings render this service very well also.

4. The earth's grid can best be demonstrated by drawing it on a large slated project globe. The use of colored chalk for special features, such as the equator, Tropic of Cancer, Tropic of Capricorn, Arctic Circle, Antarctic Circle, Prime Meridian, and International Date Line has merit. To draw parallels, hold the chalk firmly and spin the globe. Use 15° intervals for meridians to show the positions of the time zones.

5. Directions can be demonstrated on any globe that has a grid. Someone at the poles, where the meridians converge, has the possibility of traveling only in one direction when he decides to leave.

6. Distances can usually be determined quickly by using the data on the mountings of many globes. The manufacturers of globes at times supply a flexible ruler when the mounting does not make the measurements possible. Since an inch on a 16-inch globe represents 500 miles, and an inch on an 8-inch globe represents 1,000 miles, a tape measure can be used for estimating distances.

Great circle routes and distances can be demonstrated with some of the cradle globes, most of the globes with adjustable mountings, and with satellite globes.

7. Time zones can be demonstrated with a project globe, the globe with a fully-movable meridian, and with some globes that have adjustable mountings.

8. To demonstrate the earth as an astronomical body usually requires specialized equipment. One of the best is the planetarium (orrery). Its functions have already been discussed.

A globe with a fixed axis is often used to demonstrate rotation and revolution. The globe is carried around a source of light in a darkened room to show revolution and seasons. Daylight and darkness

are demonstrated by turning the globe on its axis—from west to east.

Globes that have adjustable mountings and can be "rectified" serve admirably to demonstrate earth-sun relationships as they apply to any place on any day. "Rectification" means to have the selected place "up" and the North Pole to the north. The axis of the globe is then parallel to the earth's axis.

It is an interesting exercise to rectify a globe outdoors when the sun is shining. Put a toy man at the place where you live. Note the parallelism of the shadow cast by the toy with that of the child.

9. Specialized globes have been constructed to show satellite orbits as they relate to the United States. However, any kind of satellite orbit can be demonstrated with globes that have adjustable mountings. Cradle globes that can be used to show great circles can also be used to demonstrate satellite routes.

10. A globe is used to discuss the derivation of maps. It should be pointed out that only globes show distances, directions, shapes, and areas correctly. All maps have some error.

11. A primary function of globes is to show location. Where is it? Globes should be used diligently so that mental images are formed of both absolute and relative locations. Frequently, locational image can develop from the answer to a question such as "Over what places would I fly if I wanted to travel the shortest route from Seattle to Tokyo?" or "Which city is closer to London, Montreal or New York?"

At which grade levels should globes be used? All of them. Globes rank among the best of instructional media. It behooves every teacher to acquire the skills essential to manipulating them.

## MATERIALS CONCERNED WITH GLOBES

(P—Primary; M—Middle; JH—Junior High; SH—Senior High)

**16mm Films**

*Globes, An Introduction*, Indiana University (P, M) 10 minutes

*Introducing Globes*, Bailey (P, M, JH) 10 minutes

**Filmstrips**

*Globes: Our Most Accurate Maps*, McGraw-Hill (M, JH)

*Introduction to the Globe*, Jam Handy (M, JH)

Continents and Oceans
Up and Down
North, South, East, and West
Night and Day
Hot and Cold Places

*The Globe*, Eye Gate (JH, SH)

*Using the Globe*, Eye Gate (JH, SH)

*Maps, Globes, and Graphs*, Eye Gate (M, JH)

*Using Maps and Globes*, Society for Visual Education (JH)

Taken from *Bibliography: National Special Media Institutes—Geography*, Michigan State University, East Lansing, Michigan, 1967

# The Still Picture in Geography Instruction

Paul F. Griffin and Ronald L. Chatham

The greatest responsibilities of the elementary geography teacher are to help each child grow year by year in understanding the world in which he lives and in appreciating his role as an intelligent and useful citizen. It is not enough just to teach climate, topography, regions, or even resources of the earth. How men live, where men live, how men's ways of living are influenced by their cultural inheritance, their economic problems, their political structures, and their social experiences—these are the fundamental concerns of any modern geography program. Growth toward understanding the meaning of responsible citizenship is a long process. No child can acquire such understanding unless specific problems and significant learnings and skills are continuously available to him as he studies geography. Furthermore, these learnings must be organized in a meaningful sequence based in child development. No geography program can develop basic understandings in a child's mind without developing at the same time his ability to use the essential skills and tools of geography. Among these essential skills is the ability to read and understand pictures. Eisen points out that "learning to read in geography includes reading verbal material, landscape-reading, picture-reading and map—and graph —reading."[1] She further states that each of these reading skills must be taught.

Still pictures include all pictures without motion. Besides the flat pictures, which are the most common, there are filmstrips, slides, and stereographs. The still picture supplies one of the best representations of reality and can contribute

[1] Eisen, Edna. "Reading in Geography," *Journal of Geography*, (March, 1948), 107-109.

PAUL F. GRIFFIN is a professor of geography at Oregon College of Education. His research specialties are Anglo-America, Economic Geography, and Educational Geography. He has had extensive teaching experience at Columbia University and Stanford University prior to joining the staff at Oregon College of Education.

RONALD L. CHATHAM is a professor of geography at Oregon College of Education, Monmouth 97361. His research specialties are Anglo-America, Economic Geography, and Educational Geography. He has had extensive teaching experience at Sacramento State College and Stanford University prior to joining the staff at Oregon College of Education.

much to understanding in geography. Parker maintains that pictures are the laboratory materials in geography.[2] Other scientists, such as chemists and physicists can work with their materials in their laboratories, but, unfortunately, the geographer cannot bring indoors the real subject of his analysis, for it is the face of the whole earth as modified by people. And he cannot take his students outdoors to see more than a small part of the earth. Although observation of the region being studied is naturally the most effective way of teaching geography, this is neither practical nor possible. The nearest approach that the teacher of geography can make to bringing real landscapes to his class is to use photographs of them. Thus, the still picture is the best substitute for the actual landscape where human activity is shown in its natural setting.

Pictures vary greatly in their geographic quality; all illustrations do not have geographic value. The following classes of pictures are valuable in geography teaching: (a) pictures showing the natural landscape, (b) pictures showing the cultural landscape or manmade activities, and (c) pictures combining the natural and cultural activities.[3]

[2] Parker, Edith Putnam. "Pictures as Laboratory Material in Geography." *Education* (March 1944), 434-37.

[3] National Society for the Study of Education. *The Teaching of Geography*. Thirty-Second Yearbook. Bloomington, Ill.: Public School Printing Co., 1933, pp. 385-94.

Figure 1

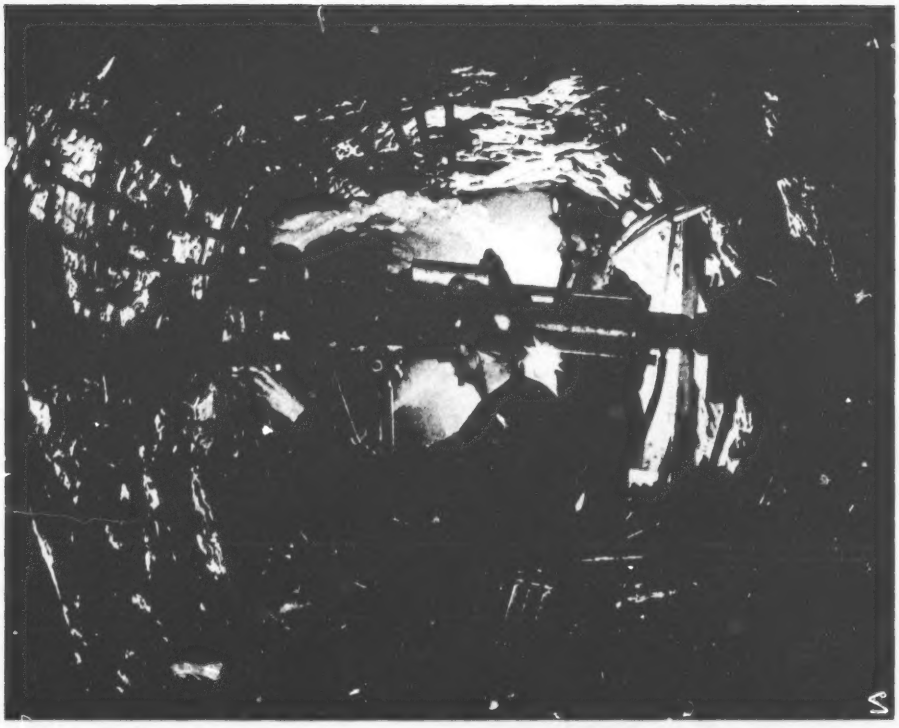


Figure 2

Pictures that show the natural landscape are useful in developing concepts of features such as landforms (mountains, plateau, hills, plains) and in defining terms pertaining to form or shape (island, peninsula, isthmus). (Figure 1) From this type the child learns to translate the picture into an accurate imagery of the real landscape. The principal purpose of this class of pictures is to build up concepts and to define terms.

Pictures that show cultural features are those which portray how people look, what foods they eat, what kinds of homes they build, what clothing they wear, how they travel and transport products, and how they work and play. (Figure 2) The purpose of such pictures is to develop an understanding that other peoples are not strange or odd, and that their ways of doing things are usually reasonable.

Pictures that combine natural features and cultural items are the most useful in teaching geography because from this type the causal relationships between man's activities and the natural environment can be developed. These pictures can be valuable tools in teaching the child to reason causally, to think geographically, and to visualize the geographic personality of a region.

Pictures may be used for many purposes, and a satisfactory picture-reading program will make use of the varied ways in which pictures can help a child to understand his world. Svec lists the purposes for using pictures as follows: (a) for general survey, (b) for detailed study, and (c) for testing.[4]

[4] Svec, M. Melvina. "Still Pictures." *Geographic Approaches to Social Education.* Nineteenth Yearbook. Washington, D.C.: National Council for the Social Studies, 1948, pp. 130-39.

General survey pictures may be used to arouse the child's interest, to preview a region at the beginning of a study, or to orient the child to a new area.

Detailed study of pictures is useful to define terms and ideas, to form concepts, to verify facts, to visualize real landscapes, to clarify ideas, to correct wrong impressions, to provoke discussion, to raise questions, to answer questions, to amplify textual materials, to make comparisons, to reinforce understandings, and to bridge the gap between experience and understanding.

A picture test at the conclusion of a unit in geography may be used for testing and evaluation. A picture test is an economy of the teacher's time in checking strengths, weaknesses, and comprehension of the pupils. Brockmeyer states, "Too often units which start off with cooperative discussion and dynamic activities are terminated with a 'horse-and-buggy' test. A picture test is valuable because it appeals to the pupil; it is rapid to check; and it gives him an opportunity to correct wrong impressions."[5]

Great care must be taken in the selection of pictures for study in geography. In picture selection both mechanical aspects and instructional aspects must be considered. Certain general criteria for picture selection are almost self-evident.

*Mechanical Aspects:* Is the picture clear and forceful? Is the detail clear and large enough for study? Is the picture

[5] Brockmeyer, Irene. "Testing with Pictures." *Journal of Geography* (February 1951), 54-57.

Figure 3

large enough for group study or should it be used by one individual at a time? Is it pleasing and interesting? Does it have a definite center of interest? Does it direct attention to the most significant facts rather than to unimportant details?

*Instructional Aspects:* Is the picture authentic? Does it convey information which the pupil needs? Is it relevant to some essential truth which is to be taught? Does it answer questions, explain or clarify concepts? Is it related to the subject being taught? Are pictures in a series arranged in logical order? Do they show continuity of a thought or procedure?

Clear-cut reproduction, legibility, clarity of detail, and definiteness are essential if a picture is to be of value in teaching. (Figure 3) The use of natural color supplies attractiveness and important detail. Studies show that children like large pictures better than small ones. A picture that is a half page or a full page in size should not increase the area shown, but should make features within the area clearer and bring them closer.

Authenticity is of paramount importance, but an authentic picture is valueless if it is fuzzy or too small to be seen clearly. Some textbook authors do not seem to realize the importance of authenticity, for they show obsolete processes and ancient scenes and represent them as current views. Old pictures have a value, but they should always be labeled as such. Children gain many misconceptions from unauthentic pictures; for instance, many children still think of the modern Dutch boy wearing balloon trousers and wooden shoes.

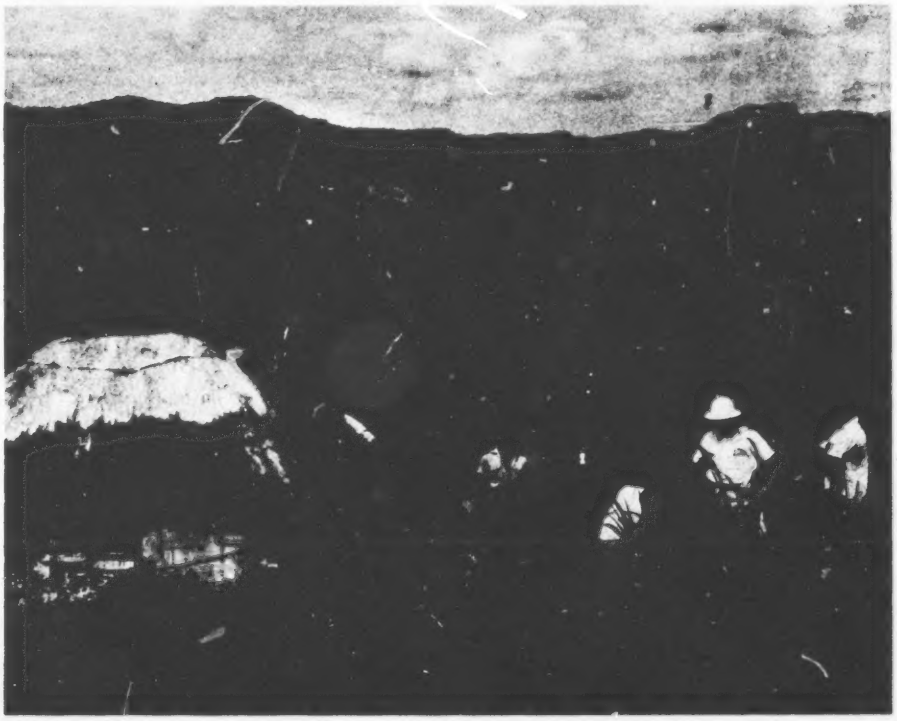


**Figure 4**

All pictures should contain a familiar object to serve as a measure by which the children can grasp size. A child standing beside a date palm tree, or by a telephone pole along a highway, or in a sugar cane field—all serve to help the student make comparisons of size. (Figure 4)

The use of pictures is not self-taught. As in reading, the child needs to have his attention directed to the things he can expect to find in pictures. He needs to develop the habit of going to pictures to find ways of living and of making a living in all lands; to notice features which indicate the nature of the surroundings in which these activities are carried on and features which indicate all the many other things that help him understand why people live as they do. Too long teachers have assumed that pupils study pictures of their own accord; too often teachers also have assumed that because every child can see the picture, he understands and interprets it in the right way. However, research studies reveal that the majority of children do not even glance at pictures in the text. Those who do notice illustrations learn little from them.

Before a teacher can train a child in the use of pictures, he himself must know how to read and understand them. He must train the child first in observing pictures, actually looking at them attentively and seeing what is presented. Children need to be taught to "see" rather than merely to "look." Then they must be led to interpret what they see and to draw conclusions. For example, by the time a child has studied regional-type geography in the fifth grade, he may draw these conclusions from a picture showing sheep being herded in a high mountain pasture: the probable time of year, the temperature, rainfall, and climate by noting the clothing worn by the herder and by the abundance or scarcity of vegetation.

Children should have a specific purpose in studying each picture, and this purpose can be established through a series of questions. When studying pictures, such directions as, "Look at the picture" or "Study the picture" are not sufficient. It is much better to say, "Look at the picture and find out what kinds of work the people are doing." This gives the child something definite to look for and at the same time puts the emphasis on man's activity rather than on natural environment. Such a viewpoint will usually give rise to other questions such as: "Why do they use the machinery shown?" or "Why do they work by hand?" The most important interrogative word for a geography question is "why," not "who" or "what," since "why" is a thought-provoking word and to answer a "why" question a child has to begin to think geographically in terms of significant relationships between man's activities and his environment.

Other factors in using pictures include the following:

1. Skill in reading pictures must be developed consistently.
2. Too many pictures should not be used at once since this tends to confuse the child.
3. Picture study should be correlated with map work.
4. Filmstrips and slides can often be more effective than sound moving films because the former can be stopped for comment and discussion.
5. The same picture can be used at different grade levels. In the first grade it might be used to identify a particular item, while in the intermediate grades it might be used to interpret relationships.
6. Pictures which show typical geographical features rather than those which stress the unusual should be used.

7. Size of objects, distances, and relief patterns need to be interpreted in terms of what the child knows.
8. Only questions to which answers can be found in the picture should be used. It is bad pedagogy to ask children how many sheep they can count in a view of a closely bunched flock. The child becomes frustrated at attempting the impossible. Such a picture could be used to define the word "flock" or to show how the herder and dog move the flock from pasture to another.

Some schools are rich in picture resources; others are poor. Some have access to a well-stocked and well-administered visual education department; others have no library or visual aids materials. Some children come from homes rich in books and periodicals; others come from homes completely devoid of such materials. But schools have textbooks, and research has shown that pictures account for 20 to 25 percent of all materials in geography textbooks for the various grades.[6] Most textbook illustrations today really illustrate; that is, they convey geographic information rather than merely break up a page of print. In a well-illustrated book, picture and text are closely tied together not only in content and meaning but also in position. If there is text relating to the picture, then associated text and material should appear on the same page or on facing pages.

Besides textbook illustrations, there are few teachers who cannot supplement the picture resources through advertisements and illustrations from their own magazines or by securing free materials. However, great care must be used in the selection of pictures from such sources. *The National Geographic, Life, Holiday,* and *The Saturday Evening Post* abound in illustrations which may contribute directly to the study of geography. Travel folders and materials supplied by chambers of commerce often contain many good geography pictures.

The captions of pictures should be appropriate and suitable on the basis of thought and of phraseology. The thought should challenge the pupil to study the picture and should be limited to the actual ideas obtained from the picture. The phraseology should be simple, direct, free from wordiness and high-sounding terms, and based on the child's experiences. Analysis of many texts reveals fragmentary phrases, needless repetition of words and phrases, introduction of irrelevant materials, and even questions which the picture does not answer.[7] Some texts do not refer to pictures in their contents; some merely refer to them; and others discuss and explain them quite fully. Practical captions provide for the expression of worthwhile geographic relationships. The possibilities in a picture are often limited by the idea stated in the caption. In the same way, the most significant feature may be ignored and some small detail emphasized.

Conclusions from this study indicate that—

1. Still pictures are considered today an important tool or device in teaching geography. They are no longer just to be looked at, but to be read.
2. In order to gain the valuable learning inherent in pictures, children must be taught to observe carefully and to interpret what they see.
3. Learning from pictures is not ac-

[6] Melbo, I. R., and Waterman, I. R. "Pictures in Geography Textbooks." *Elementary School Journal* (January 1936), 362-76.

[7] Svec, M. Melvina. "Better Captions for Picture Study." *Journal of Geography* (October 1944), 226-70.

quired incidentally, but results from carefully planned study activities.

4. Skill in reading pictures is useful in developing geographical concepts, but pictures alone are not sufficient. Geographic understandings are acquired by the combined use of still pictures, textual materials, maps, globes, and observation of real landscapes.

## REFERENCES


### Books

1. Fraser, Dorothy, and West, Edith. *Social Studies in Secondary Schools*. New York: Ronald Press, 1961.

2. James, Preston E., editor. *New Viewpoints in Geography*. Twenty-Ninth Yearbook. Washington, D.C.: National Council for the Social Studies, 1959.

3. Kenworthy, Leonard S. *Guide to Social Studies Teaching*. Belmont, Calif.: Wadsworth Publishing Co., 1962.

4. Kohn, Clyde F., editor. *Geographic Approaches to Social Education*. Nineteenth Yearbook. Washington, D.C.: National Council for the Social Studies, 1948.

5. Moffatt, Maurice P. *Social Studies Instruction*. Englewood Cliffs, N.J.: Prentice Hall, 1952.

6. National Council of Geography Teachers. *Geography, How to Teach It*. Bloomington Ill.: McKnight and McKnight, 1934.

7. National Society for Study of Education. *The Teaching of Geography*. Thirty-Second Yearbook. Bloomington, Ill.: Public School Publishing Co., 1933.

8. Reeder, Edwin H. *Geography for Public School Administrators*. New York: Teachers College, Columbia University, Bureau of Publications, 1931.

9. Thralls, Zoe A., and Reeder, Edwin H. *Geography in the Elementary School*. New York: Rand McNally and Co., 1931.

10. Williams, Catharine M. *Learning From Pictures*. Washington, D.C.: National Education Association, 1963.

### Periodicals

1. Allard, Lucille. "The Use of Visual Aids in Teaching Elementary Geography." *Education* 64: 428-33; March 1944.

2. Brown, Ralph H. "Testing in Geography at the College Level." *Journal of Geography* 36:140-48; April 1937.

3. Crawford, E. Winifred. "Pictures in Geography Teaching." *Education* 64:438-41; March 1944.

4. Cropper, Floyd A. "An Experimental Evaluation of the Ability of Children to Interpret the Pictures used in Elementary Textbooks in Geography," *Journal of Geography* 34:89-101; March 1935.

5. Eisen, Edna E. "Reading in Ge-

ography." *Journal of Geography* 47:107-109; March 1948.

6. Halverson, L. H. "A Quantitative Analytical Comparison of Geography Textbooks." *Journal of Geography* 35:60-67; February 1936.
7. Hile, Martha Hane. "The Use of Photographic Material in the Teaching of Geography." *Journal of Geography* 37:55-63; February 1938.
8. Kusch, Monica H. "Geography: A Laboratory Subject." *Journal of Geography* 39:203-206; May 1940.
9. Landy, Dorothy. "Geographies—Then and Now." *Journal of Geography* 48:383-79; December 1949.
10. McClusky, F. Dean. "Visual Instruction and the Teaching of Geography." *Education* 64:401-403; March 1944.
11. Melbo, Irvin R., and Waterman, Ivan R., "Pictures in Geography Textbooks." *Elementary School Journal* 36:362-76; January 1936.
12. Merton, Mineta. "Effective Use of Still Pictures in Elementary Social Studies." *Social Education* 4:489-92; November 1940.
13. Miller, E. Willard. "The Use of Color Slides as a Geographic Teaching Aid." *Journal of Geography* 64:304-307; October 1965.
14. Parker, Edith P. "Pictures as Laboratory Materials in Geography." *Education* 64:434-37; March 1944.
15. Proudfoot, Malcolm J. "The Use of Photographs in Teaching Geography at Four Primary Levels." *Journal of Geography* 34:61-67; February 1935.
16. Riley, Norma. "A Picture Library and Its Use." *Journal of Geography* 37:202-205; May 1938.
17. Scarfe, Neville V. "Testing Geographical Interest by a Visual Method." *Journal of Geography* 54:377-87; November 1955.
18. Schnorrenberg, Kathryn. "Visual Materials Vitalize Geography." *Education* 64:423-27; March 1944.
19. Statlander, Elizabeth. "Pictures in Geography, An Experiment in Individual Versus Group Study." *Journal of Geography* 35:360-64; December 1936.
20. Svec, M. Melvina. "The Still Picture." *Journal of Geography* 47: 111-12; March 1948.
21. ——. "Better Captions for Picture Study." *Journal of Geography* 43: 266-700; October 1944.
22. Teske, Alfred E. "Geography Field Trips Via Colored Slides." *Journal of Geography* 58:334-40; October 1959.
23. Vayette, Kenneth. "A Study of Children's Responses to Geography Pictures." *Journal of Geography* 40:262-73; Ocotber 1941.
24. Vegter, Dorothy O. "Using Still Pictures in Geography." *Journal of Geography* 48:334-36; November 1949.

# A Road Map to Geography

George Vuicich

Last year the U. S. Bureau of Public Roads reported there were approximately 80 million private automobiles registered in the United States. Crammed into the glove compartments of nearly all of those cars is at least one road map. Millions of youngsters have been exposed to this type of map if only through being asked by frustrated parents to attempt to refold it correctly. It would seem, therefore, that the geography or social studies teacher who passes up the opportunity to bring into the classroom such a timely and ubiquitous teaching device is missing a good bet. It also would seem that this introduction into the characteristics and use of maps could take place effectively anywhere from grades 3 through 10.

Students could easily be introduced not only to the general notion of what a map is but also become familiar with the characteristics of legend, scale, grid, and symbols. How a geographer uses a map as an analytic device could also be demonstrated nicely by leading students into an inquiry of the relationships between the physical environment and the road pattern; the relationship between the size, number, and spacing of urban places; the interaction which takes place among cities and people; and the impact of culture and physical environment on the political divisions represented on the map.

## QUESTIONS AND DISCUSSIONS

The suggested questions and discussions which follow are only a few of many which could be developed and which could extend through several class periods. In fact, a unit of a week or longer could be constructed. Although there is a conscious effort herein to begin with the simple and proceed to the complex, the sequence of discussion questions need not be rigid. It is recommended, however, that students work in pairs inasmuch as the interchange between them could be stimulating. The discussion questions can be listed either on the chalkboard or given to students on a work-study sheet. Or, the teacher may want to raise them at opportune times during class discussions.

GEORGE VUICICH is currently assistant director of the High School Geography Project, P.O. Box 1095, Boulder, Colorado 80302. He is on leave from his position as professor of geography at Wisconsin State University, Eau Claire. He has extensive teaching experience at the secondary and college levels.

The maps are usually available at no cost from local gasoline filling stations or from branch offices of many petroleum companies. Another source is the State Highway Department. If students live in a large city, it would be beneficial to have them work with a city street map as well. Having city and state maps would present a variation in scale from which interesting comparisons could be made. Whichever maps are used, it would seem desirable to use maps issued by the same petroleum company.

## ORIENTATION AND INQUIRY

Even though students have some degree of familiarity with the road map they should be allowed time to acquaint themselves further with the map. This orientation period could be directed or non-directed; i.e., students could be asked to look for particulars or they could be allowed to explore randomly.

Following the orientation session inquiry could begin by raising the question, "What are some of the objects shown on your map?" The answers will probably include the specific objects shown and the symbols used to portray them. Emphasis should be on objects at this point. The answers could include roads, urban places, counties, rivers and lakes, state parks, points of interest, shaded relief, and a variety of other objects. Such a listing should be followed by the question, "How do you know?" The answer is, of course, the map legend to which students' attention should be specifically directed.

Upon receiving their maps, one of the first things students will probably do is locate their home town. For this reason it might be desirable to begin the inquiry by using this curiosity to develop an understanding and an ability to use the grid system for locational purposes. (If this option is used, questions dealing with the objects shown on the map can be integrated into the discussion wherever feasible.) This can be initiated simply by asking students the location of their home town. Answers will vary depending upon the map reading level of each student. Some will locate their home town by saying it is in the central part of the state; or that it is about 45 miles from the state capital; or that it is near a particular city. Because these answers are correct, but not necessarily accurate, students sould be urged to be more precise. If no one has realized the significance of the system of numbers at the top and bottom and the letters along both sides of the map, their significance should be brought out. The discussion involving the use of this system should broaden into a consideration of the latitude-longitude system. A comparison of these grid systems with the earlier and less precise way of locating objects should be brought out.

## MAP SCALE

Attention should now be focused on the map's scale. This can be initiated by asking how far it is from one city to another. Some answers are bound to be precise figures obtained by adding the mileage figures shown on the map. Although this is acceptable it should be pointed out that it is time consuming. A faster method would be to use the scale shown in the legend. Once their attention is drawn to map scale, students should be exposed to a line of inquiry involving the following types of questions: "What is map scale? How do we represent map scale? What is meant by 1 inch represents 60 miles or by 1:4,000,000? Why are there maps with different scales? During the discussion of scale, students' attention ought to be called to the inset maps shown on the state road map as well as the city map, if one is being used. The scale of the inset

maps is usually different from that of the road map and can, therefore, be used for comparison purposes. Comparisons of scales should include any wall maps which might be available. The object of the comparison is to help students see what happens as map scale is changed. Two notions should be developed. First, as the scale of the map becomes smaller a) the amount of detail possible on the map also decreases and b) the sizes of the area shown usually increases; and second, as the scale of the map becomes larger a) the amount of detail possible on the map increases and b) the size of the area shown usually decreases. Now students ought to search for answers to such questions as "What does the state road map show that the map of Eurasia or North America does not, and vice versa?" and "What are some of the advantages and disadvantages of small scale and large scale maps?" If time and the teacher's background permit, it would be advantageous to carry the discussion into the area of map distortion.

## MAP ANALYSIS

Up to now emphasis has been on familiarizing students with the map's characteristics with no attempt to use it as an analytic tool. In other words, there has been no attempt to use the map to teach geographic notions. The questions which follow attempt to bring about analyses at an elementary level. However, depending on the background of the teacher, some of the notions presented could be used as springboards into a much more detailed investigation later in the course.

In this context students ought to look at the map with a different perspective. To help them gain this perspective it is recommended that they view the map from a distance—at least arm's length—so that patterns are more readily discernible. The clarity of these patterns will vary from one state to the next but in almost all cases some semblance of pattern should be recognizable. For example, in looking at a road map of Colorado one can see the change in the road network, the orientation of the highways, and the orientation of county boundaries as one progresses from the eastern plains portion of the state into the central mountainous area and again out of the mountainous area and into the intermontane region in the extreme western portion of the state. Easily visible are the rectilinear counties so characteristic of the American Land Survey system in the eastern and extreme western portions of the state and the forced abandonment of such a system in the mountains. It is also significant that there will be little variation in patterns from one part of a state to another, as is the case in many of our Great Plains states, and this should be noted and explained. On many maps the association between physical relief and patterns and density of roads and urban places becomes more obvious through the use of shaded relief.

There is much more that the imaginative teacher can extract from a careful scrutiny of an ordinary road map. However, even though this be all that students are exposed to, we can hope that they will look a second time before they return the map to its resting place until the next family outing.

# Overhead Transparencies for the Upper Grades

Robert E. Gabler

In many of our elementary schools today overhead projectors are available for use by the upper grade teacher. In fact, in most of our better elementary systems the overhead projector has become standard equipment. Yet, even in the schools where overhead projectors are readily available, they often remain unused or untried by the majority of elementary geography and social studies teachers.

The overhead projector is one of the most effective ways for the elementary geography teacher to teach map skills and understandings. With its accompanying transparencies, it constitutes one of our best means for teaching map correlation and for illustrating one of the fundamental concerns of geography and the geographer—the interrelationship of phenomena within a given region. A series of overhead transparencies, constructed to match a standard base, can make comparative map study an enjoyable and rewarding experience in the fifth and sixth grade classroom.

If the use of overhead transparencies is so practical, there must be an excellent reason why so many overhead projectors rest quietly on closet shelves. The reasons may well lie with the relative unavailability of appropriate commercial transparencies and overlays for use in grades five and six and the high cost of those that might be appropriate. An additional reason might be that many teachers are much more inclined to use materials they have prepared themselves than materials which have been purchased from commercial sources.

## THE NEED FOR TRANSPARENCY OVERLAYS

What is needed most in the fifth and sixth grade classroom are sets of overhead transparencies, organized on a country-wide or nation-wide base, and prepared to illustrate various phenomena

Robert E. Gabler is a professor of geography and chairman of the department of geography and geology at Western Illinois University, Macomb 61455. He specializes in geography in education, has directed three NDEA summer institutes in geography, and is the director of coordinators for the National Council for Geographic Education.

studied by geographers. The curriculum in grades five and six generally deals with particular regions of the world, for example, Anglo-America, Latin America, the Western Hemisphere, or the Eastern Hemisphere. But more specifically, what is actually studied is the country or political unit within these major regions. Although geographers often tend to overlook the fact, most of our educated citizens tend to subdivide the world politically and not into agricultural, climatic, physiographic, or landuse regions. Place naming by political subdivision is the basis for most "geographic" references in textbooks, literature, newspapers, and other communication media. Hence, there is an emphasis on political subdivision in our schools and there is a need for educational media which recognize this emphasis.

Many transparencies may be constructed for an individual nation or, in the case of a large nation like the United States or the Soviet Union, for a smaller political subdivision within the nation. And, if the majority of the transparencies are made by the teacher, they can be made at relatively low expense. If possible, the teacher should choose a landform transparency as a base map and prepare additional transparencies for use as overlays. It is likely that the teacher might wish to purchase the landform base transparency, as it is the most difficult to prepare accurately. In addition, this type of physical geography transparency is most universally available from commercial sources at competitive prices. (See Fig. 1)

It is recommended that the teacher prepare a standard set of transparencies for use with each physical base. A standard set seems a logical choice because certain mappable information is readily available for all the world's regions and, hence, will be available for all the political subdivisions to be discussed during the school year. There is also considerable educational value in the examination of maps which show much the same phenomena for several political subdivisions. Relationships observed early in the year may be reinforced or modified. As the year progresses, the students will also be working with data that will become more and more familiar and increasingly sophisticated inferences can be drawn as the procedure is repeated.

Considerable care should be exercised in the selection of the maps to be included in the standard set of overlays. These maps should illustrate phenomena that may well have relationships to the phenomena shown on the other overlays. As the transparencies are used in the classroom, they may be superimposed one on the other so that the student can readily observe the coincidence or lack of coincidence of the various phenomena being studied. Herein lies the real value of the overhead projector and transparencies

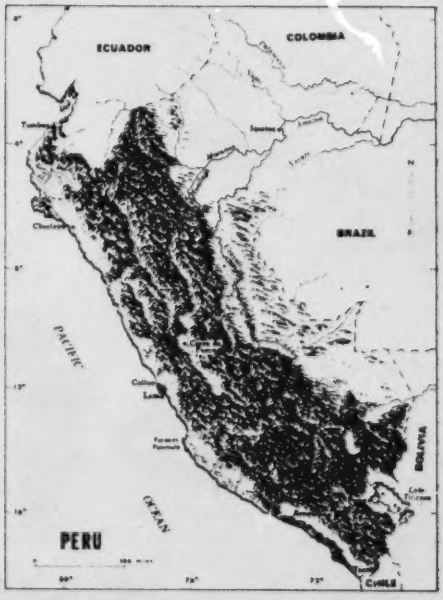



FIGURE 1
The Landform base map of Peru. (Reprinted by permission of Paul F. Griffin and Ronald L. Chatham, Oregon College of Education, Monmouth, Oregon.)

which may be used as overlays. Textbooks and atlases have long presented maps showing different phenomena within the same region side by side. Teachers have urged the study of the similar or dissimilar distributional patterns illustrated by these maps. The use of overhead transparencies greatly simplifies this task of comparison, because the similiarity of distributional patterns becomes readily apparent.

Just as the geographer studies and seeks to explain relationships between phenomena in the field, the geography student can undertake similar study in the fifth and sixth grade classroom through the use of transparent overlays. This is a classic opportunity for learning by discovery and for inductive reasoning. As the transparencies are superimposed upon the screen, the student can observe relationships between phenomena for himself. He can draw his own inferences and seek his own explanations. However, it is at this point that the teacher is strongly advised to proceed with caution. The elementary teacher must be ever mindful of the too-easy answer or of the misleading assumption that any coincidence of distributional patterns immediately proves a cause and effect relationship. It is exceedingly rare when cause and effect can be directly established between two phenomena in space and it is the search for the additional phenomena or factors necessary to complete the explanation which may be the most challenging. It is the struggle to reconstruct the total picture which is often most rewarding and stimulating for the young geographer. Within the framework of budget, available data, and the skills required, the student may even suggest additional phenomena which need to be mapped, and he should be encouraged to construct the transparencies himself.

## THE SELECTION AND USE OF OVERLAYS

It is naturally difficult to choose a set of transparencies equally applicable to all major political subdivisions, but most geographers would generally approve of a basic list that includes the following phenomena and fundamental distributional patterns:

### Physical Base

The physical base map should illustrate as much information concerning landforms, elevation, and general topographic features as it is practical to include on the transparency. The landform base is obviously a stage upon which man constructs his economic, political, and cultural "scenery." It bears a close relationship to a variety of other phenomena. Study of the physical base map allows the fifth and sixth grade child to draw inferences concerning land use, agriculture, manufacturing, and additional economic activity. Subsequently, these inferences can be examined in the light of other overlays included in the set.

### Population

The distribution of population may well be on the basic pattern which needs explanation and which can prompt meaningful thought on the part of the elementary child. The population pattern is closely related to all of the other human geographic or cultural geographic patterns. It is the population map which raises many of the fundamental geographical questions which the intermediate grade child can recognize and attempt to answer for himself. The big question is always present: why has man chosen to live in one place in a region in significant numbers when he has obviously avoided another?

### Average Annual Precipitation

The map of average annual precipitation is the distributional expression of one of the two major climatic factors. Coupled with the growing season map and the physical base, the rainfall map helps to characterize the limits of the natural environment with which man must deal. The rainfall map has obvious relationships to the distribution of natural vegetation and to agricultural land use; and, in the search for an explanation for certain aspects of the precipitation pattern, to the physical base as well.

### Growing Season

The transparency overlay which indicates the average length of the growing season is the companion map of that which illustrates precipitation. The map of growing seasons helps to complete the picture of climate for the elementary child. In the upper elementary grades it is not realistic to introduce the average child to climatic regions and their classification. Because of the sophisticated nature of the concept this is usually postponed until the junior high grades. However, it is a step in the right direction to examine maps of precipitation and growing season together. Growing season is a readily understood expression of temperature, and temperature and precipitation are the major building blocks of the climatic factor.

Growing season data facilitate the broad climatic classification of a region into tropical, mid-latitude, or polar. Like the precipitation map, the growing season map bears a close relationship to agricultural land use and may contribute to the explanation of population distribution.

### Transportation

To round out the standard set of overlays, some easily recognized distributional pattern which represents the works of man is needed. The map of transportation fits admirably. The availability of transportation provides considerable insight into the important geographic phenomenon of accessibility. Trade, as well as the transfer of people and ideas, is directly related to the pattern of available transport. Indeed, the relative availability of transportation provides considerable evidence concerning the stage of technological development and the economic status of the nation under consideration. The use of the overlay which shows transportation may pose some special problems to the teacher. General information concerning the location of all-weather roads, railroads, navigable waterways, and major air routes is readily available; but information concerning the relative importance of each may be especially significant and less attainable. Such information might be necessary as the teacher may wish to offer some data or general guidelines concerning the relative significance of each type of transportation when the children compare the transport map with others, such as the physical base map or the map of population, precipitation, or growing season. Consider the situation in South America where air transport plays such a major role; yet a simple map of transportation routes would probably not properly illustrate this fact.

### Special Purpose of Additional Maps

The suggestion of a standard set of overlays is not meant to preclude the preparation and use of a wide variety of other overlays representing additional distributional patterns of interest to the fifth and sixth grade student of geography. The selection of additional maps is left to the discretion and initiative of the individual teacher. Overlays illustrating land use in broad classification, native vegetation, the distribution of ethnic

groups, religions, or languages, or the location of specific economic resources would often be of real value in promoting skills in map correlation and reconstructing the geography of a specific region. Information for the preparation of all these overlays is usually easy to locate. In addition, the resourceful teacher may be able to prepare some valuable special-purpose overlays utilizing information found in major newspapers, professional journals, or national news magazines.

## THE PREPARATION OF OVERLAYS

Chief sources of information for the construction of transparencies would include major college, secondary school, and even elementary school atlases. Elementary school textbooks often have individual maps or atlas sections which can be modified with a minimum of effort. With appropriate adaptation, high school and college textbooks may contain information on maps which will prove suitable. The physical base map can take the most time and skill in prep-

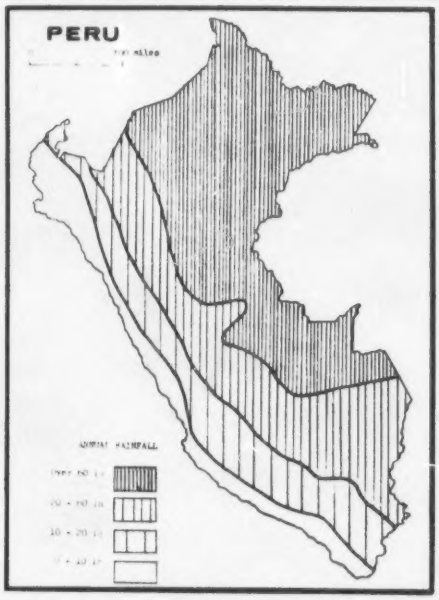



FIGURE 3
Peru: The Distribution of Annual Rainfall.

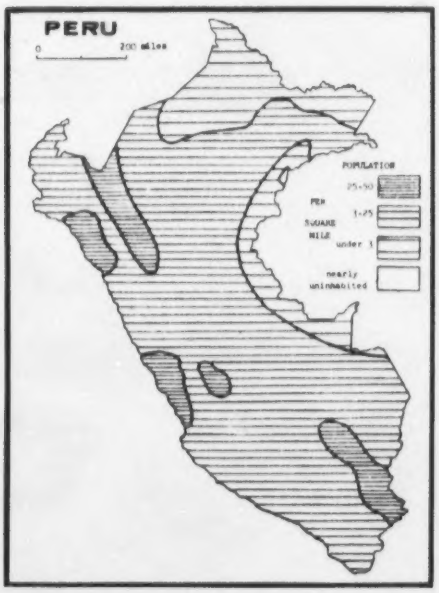



FIGURE 2
Peru: The Distribution of Population.

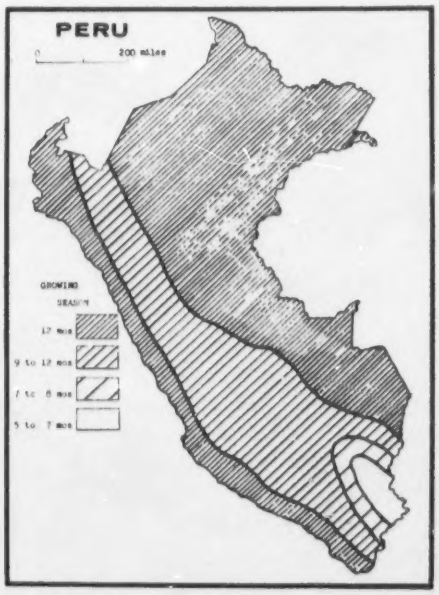



FIGURE 4
Peru: The Average Length of the Growing Season.

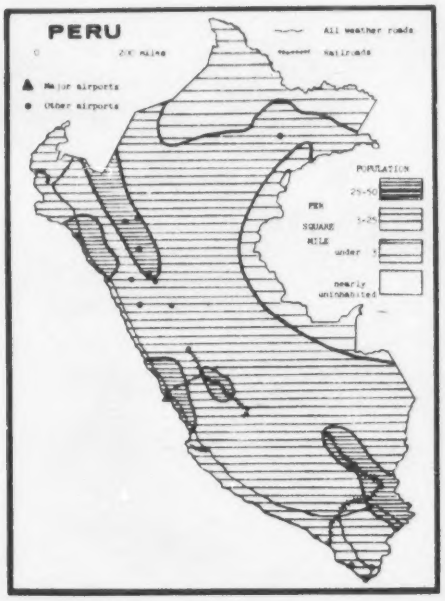



FIGURE 5
The overlays of major transportation routes and population distribution superimposed. Where might you next build a railroad in Peru?

aration, although it need not be as elaborate as the example shown in Fig. 1. As previously mentioned, many teachers may choose to follow the example illustrated here and select a landform base which is commercially available.

It is highly recommended that the transparency overlays be simple copies of black and white line drawings. The drawings can be prepared on plain white paper utilizing a soft lead pencil.

The copy can be made with any one of a number of commercial copying machines which make transparencies. It is likely that a thermal dry-copy machine will be most readily available to the teacher.

All of the transparencies illustrated in this paper, other than the physical base, were prepared during the recent Instructional Media Institute for Geographers held at Michigan State University. The only materials used were a No. 2 lead pencil, a pad of tracing paper, and a straight edge. The only sources of information were three general-purpose college atlases and an elementary textbook. Average time consumed in preparing a single transparency varied from one to two hours depending upon the difficulty of adapting the original map to the upper elementary level. Each transparency was limited to four patterns for the sake of simplicity.

The line patterns chosen for the population, rainfall, and growing season overlays can be easily drawn by the teacher. Although they may not conform with the best cartographic practices, they are readily understood by children who soon associate the increasing density of lines per inch with the increase in phenomena represented. (See Figs. 2, 3, and 4) All legends and titles may be freehand printed using the lead pencil and they will reproduce well. The illustrations represent quite faithfully the quality and

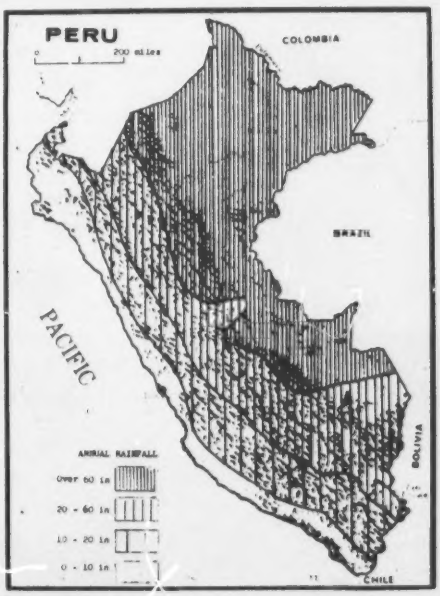



FIGURE 3
The map of annual rainfall distribution superimposed upon the physical base. This would make an interesting study if compared to the same two maps of Washington and Oregon.

quantity of work that can be done by a teacher during the free hours of a weekend.

Figures 5, 6, and 7 are photographs of actual superimposition of one transparency on another. The extent of coincidence between compared phenomena is often readily apparent (as in Figs. 5 and 6). However, when two transparencies bearing line patterns are to be superimposed, the teacher is first strongly urged to have students carefully examine each individual map. When the general distribution of the phenomena to be compared is firmly fixed in the minds of the students, examination of the two transparencies together can then be undertaken successfully. (See Fig. 7) It is also suggested that use of color, now readily available in the thermal dry-copy process, may significantly improve the quality and increase the value of the overlays.

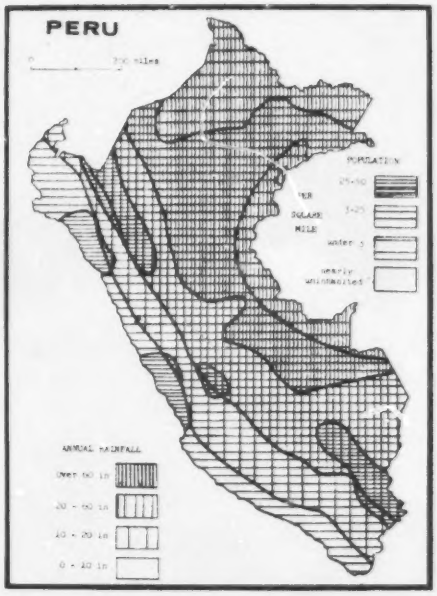



FIGURE 7
The overlays of annual rainfall distribution and population distribution superimposed. How do you explain the population concentration along the arid coast?

## CONCLUSION

Most elementary schools today have overhead projectors as standard equipment, but these projectors and accompanying transparencies are overlooked as educational tools by many geography and social studies teachers. This is true even though the use of a physical geography base map and transparency overlay is an especially good device for teaching map correlation and for providing students with the opportunity to learn by discovery and to suggest and test hypotheses regarding the relationships of various distributional patterns. One solution to this problem would seem to lie in the development and use by the teacher of a standard set of transparent overlays. The set would include overlays representing the distribution of landforms, population, average annual precipitation, growing season, transportation, and selected additional maps. The necessary transparencies can be prepared from readily available information at a minimum cost and with a reasonable amount of effort on the part of the teacher. There is every indication that the effort expended will be justified by the results attained in the classroom through the use of the transparencies.

# Utilizing the Audio-Tutorial Approach

Richard Beckman,
Robert Janke, and Gilbert Tanner

For many years there has been a steady increase in the size of introductory college classes.[1] Although learning can take place in such situations, teachers must make provision for individualized learning experiences. Research indicates that the learning process is reinforced by the utilization of a variety of different real and vicarious learning experiences. Postlethwait[2] has said, "While much still needs to be known concerning the process of learning, one needs not to await clarification of this process in order to employ activities and create situations which are well recognized to contribute to learning." Recent technological advances permit us to create a variety of learning experiences. We can now approach the educational process by creating activities and situations which motivate and involve the learner so that learning becomes exciting.

The challenge that exists for educators is to provide learning experiences which are expertly conceived, ingeniously created, and logically sequenced!

The authors are currently engaged in a curriculum resource development program designed to produce a wide range of materials and procedures for the teaching of introductory physical geography. These will provide a variety of stimulating experiences promoting greater student participation in the learning and appreciation of spatial relationships and processes. These factors are the primary concern of geography and can be understood more easily and learned more effectively when students are exposed to a variety of imaginative approaches. This program will provide a vast library of resource materials designed for introductory geography pro-

[1] An unpublished study of introductory college geography courses conducted by Albert Jackman and Gilbert Tanner with the cooperation of the AAG Central Office 1966.
[2] Letter of 14 December 1966 from S. N. Postlethwait.

RICHARD BECKMAN is director of audio visual services at Wisconsin State University, Eau Claire 54701. He has studied at Stout State University and the University of Missouri. His chief interest is in the improvement of instruction by well-programed resource materials.

ROBERT JANKE is an assistant professor of geography at Wisconsin State University, Eau Claire, and a candidate for the Ph.D. degree at Michigan State University. His academic interests are physical geography and cartography.

GILBERT TANNER is an assistant professor of geography at Wisconsin State University, Eau Claire. His primary academic interests are cartography and physical geography. His current research interest is the development of resource materials for introductory college geography courses.

grams utilizing the Audio-Tutorial System as the instructional core.

The Audio-Tutorial concept[3] was developed by Dr. S. N. Postlethwait at Purdue University for a freshman botany course, as an attempt to adjust to the diverse backgrounds of students.

Because his students had attended a wide variety of high schools, some had received excellent training, while others had received relatively poor training. Students with equal capacities could not perform equally well because of this difference in their backgrounds. Dr. Postlethwait decided to make a special taped lecture weekly to assist the students with poor backgrounds. The tapes were filed in the audio-visual library. Students were permitted to use this facility to listen to the supplementary lectures. While preparing these lectures, it occurred to Dr. Postlethwait that the students might bring their textbooks along and follow the subject matter covered by the tape. Later, it seemed logical to follow the laboratory manual in the same manner. Still later, it seemed feasible to provide the students with plants and experimental material so that these could be related to the laboratory manual, to the textbook, and to the taped lecture. Ultimately, the discussion on the tape was no longer a lecture, but a teacher-to-student discussion, in which the teacher was tutoring the student in a sequence of learning events.

These events included a wide range of experiences such as reading from the text; conducting an experiment; collecting and analyzing data; manipulating a microscope; watching time-lapse movies; observing plant specimens, charts, diagrams, photographs; and listening to brief lectures or discussions.

[3] S. N. Postlethwait, J. Novak, H. Murray, *An Integrated Experience Approach to Learning* (Minneapolis: Burgess, 1964).

The current botany course at Purdue centers around an independent study session which the student attends at his convenience (the laboratory is open 14 hours a day, 5 days a week). He signs in at a self-study booth, and then is directed through a series of varied experiences by an audio-tape prepared by the senior instructor. The personal tone of the presentation makes each student feel that the instructor is tutoring him individually. Since each carrel is a self-contained unit, the student may proceed at his own rate and repeat each step as often as necessary. At least one laboratory instructor is available at all times to help students with individual questions.

When the student has completed the independent study units for the week, he attends a modified seminar-quiz session (8 students), participates in an oral quiz and is given a score based on his performance. This quiz session also enables students to review concepts and relationships and at the same time enables the instructor to receive an effective feedback which can provide clues for improvements in the course structure.

In addition, students may attend an optional one-hour general assembly session each week conducted by the senior instructor. This session establishes the personality of the course, students have an opportunity to meet the voice on the tape, and guest lecturers and longer films are presented to enrich the course content.

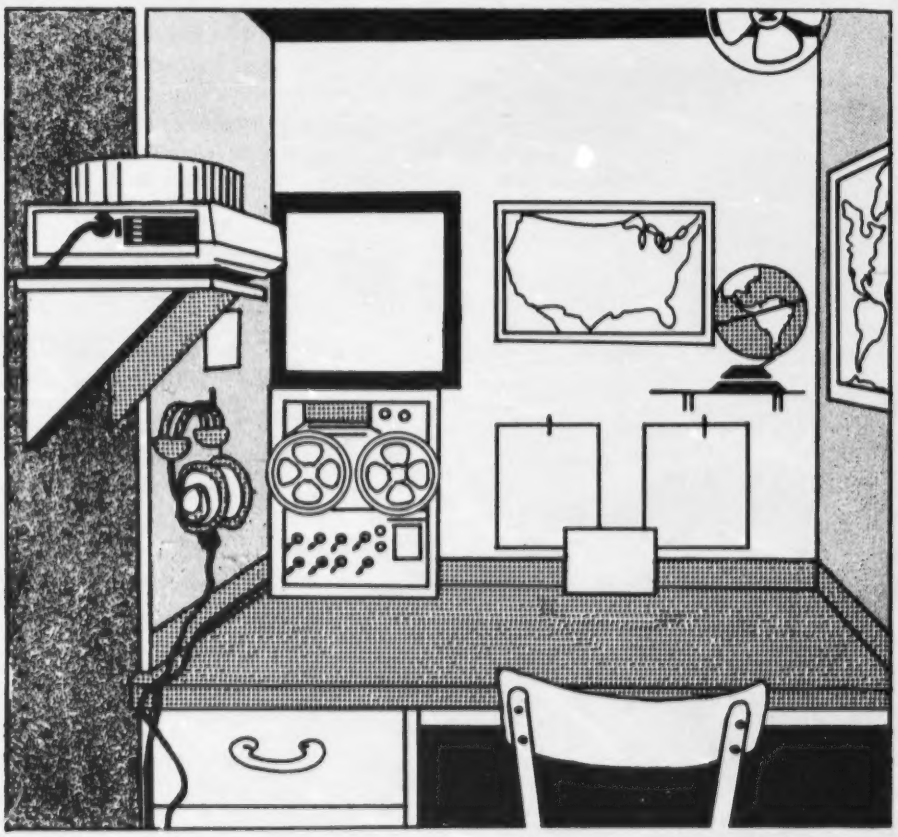
Geography has used visuals, especially maps, both as research tools and as instructional media more than most other disciplines to explain the complex spatial relationships which exist at scales too great to "experience" by other methods. So many of the basic concepts of geography such as areal differentiation, patterns of distribution, regional interaction, diffusion, and dispersion readily lend themselves to visualization and, as a

result, are more quickly and completely understood.

A discipline which has these characteristics is a "natural" for the audio-tutorial approach, provided the proper programs and materials can be developed to fit the system. Without expertly conceived materials and procedures the system cannot function. As Harold Howell, Commissioner of Education, aptly put it, "Like a drug for which there is yet no disease, we now have some machines that can talk but have nothing to say."

Many talents are needed to create an audio-tutorial learning system. We are past the era when the "ivory tower" thinkers are the only respected members of the academic community. Today we need doers as well as thinkers. We must draw from the talents of the best geographers, the best educational psychologists, the best programers, the best audio-visual specialists, and the most experienced advisors and consultants. These men, as a team, need to use all the imagination and enthusiasm at their command to create the action necessary for boldly providing the activities and learning experiences which will *stimulate the learner*. We need to make the learning experience a challenge instead of doldrum. Talent and teamwork are the most important elements in the development of a learning system.

The procedures which are followed in the curriculum resource development program referred to above are here briefly described. The initial step of this



program is to make an inventory of all of the significant concepts, principles, and facts which are usually included in the context of introductory physical geography courses. This inventory, resulting from preliminary examinations of textbooks, laboratory manuals, reference materials, and course outlines, visits to colleges of various kinds, conferences with outstanding teachers, and finally discussions with several consultants, will define the items which are developed in the subsequent steps.

When the inventory is complete, the internal sequence, or order of the ideas necessary to the best understanding of each of these items, will be established. Our experience with this method reveals the importance of a non-geographer as a teammate to keep the geographer from leaving out elementary steps of sequential development, which, because of his more complete background, seem to him unnecessary.

As the internal sequence of each concept is completed, it will be assigned to a unit. At this point several team members (geographers, educational psychologists, audio-visual specialists, and various technicians) will take over the development of procedures and materials to support each of these units, which will be completed by the various technicians.

An important concurrent activity will be a review of the existing materials, including the following activities:

1. To search out the many excellent materials (such as 2 × 2 slides, handouts, examinations, study questions, field trip procedures) which have been produced at colleges and universities, as well as commercial materials, and adapt them to this program.

2. To examine the procedures and materials developed by the several secondary curriculum projects (such as the Earth Science Curriculum Project and the High School Geography Project) and supplement and coordinate this information.

3. To adapt and utilize the single concept films which have been reviewed by the Michigan State University Film Clip project.

4. To secure supplementary illustrations from 1) publishers, such as the National Geographic Society, Time-Life, and Look, 2) major picture agencies, such as Black Star and Ewing Galloway, and 3) government agencies, such as the Geological Survey, Department of Agriculture, and Weather Bureau.

5. To collect, revise, and adapt other useful procedures and materials as they are discovered.

As units are completed, limited preliminary classroom tests will be conducted and the results evaluated. As the program develops some time will be spent discussing and developing broad procedures such as:

1. Shorter lecture periods (e.g. 25 minutes) which will permit fewer concepts to be presented at one time and permit greater absorption by students.

2. Philosophy of group dynamics and related procedures. ("What should happen in a discussion section?")

3. Grading and evaluation procedures with test and control groups to check the results.

4. Critical appraisal of field trip procedures with an opportunity to develop new techniques.

5. Procedures for other broad segments as they are discovered.

When the units are complete, fairly extensive field testing will be carried out. A variety of different schools will be selected for the field trials and a profes-

sional will be retained to supervise the evaluation procedures. As materials are completed they will be published in a form suitable for use by the profession.

## SUMMARY

The population and knowledge explosions, coupled with a relative decrease in qualified teachers, have placed steadily increasing pressures on our educational facilities. At the same time higher education has become available to a larger segment of the population. This has resulted in an accelerating variation in background and preparation of the student bodies. To solve the instructional problems caused by these and other related factors, we must turn to more efficient and effective educational methodologies. Technology has provided the machines which will make these changes possible. It is up to us to create learning experiences with exciting materials and programs. This can be accomplished best by teamwork.

---

° Many of the ideas contained in this article are the result of a series of informal conferences of geographers from Carroll College at Waukesha, Wisconsin, Western Michigan University at Kalamazoo, and Wisconsin State University-Eau Claire, which began in June 1966. As this article is written, plans are underway to implement an audio-tutorial system for introductory geography courses at a number of schools, including those mentioned above. Carroll College installed an audio-tutorial laboratory during the summer of 1966 and began a program in the fall semester. (See *Journal of Geography*, April 1967) The authors would appreciate any information from other centers where a similar system is contemplated or in existence.

## A BRIEF BIBLIOGRAPHY ON EDUCATIONAL MEDIA

GENERAL REFERENCES

Brown, J. W., and J. W. Thornton, eds. *New Media in Higher Education*. Washington, D.C.: Department of Audiovisual Instruction, National Education Association, 1963.

"Instructional Materials: Educational Media and Technology." *Review of Educational Research*, Volume XXXII, No. 2, 1962.

McLuhan, Marshall. *Understanding Media*. New York: McGraw-Hill, 1964.

Trow, W. C. *Teacher and Technology—New Designs for Learning*. New York: Appleton-Century-Crofts, 1963.

GENERAL AUDIO-VISUAL REFERENCES

Brown, J. W., R. B. Lewis, and F. F. Harcleroad. *A-V Instruction: Materials and Methods*, 2nd Edition. New York: McGraw-Hill, 1964.

Erickson, C. W. H. *Fundamentals of Teaching with Audiovisual Technology*. New York: The Macmillan Co., 1965.

MANUALS—EQUIPMENT AND MATERIALS

*The Audio-Visual Equipment Directory*, 12th Edition. Fairfax, Virginia: National Audio-Visual Association, 1966.

*Educational Media Index*. 14 volumes. A project of the Educational Media Council under a contract from the U.S. Office of Education. New York: McGraw-Hill, 1964.

Minor, Ed. *Simplified Techniques for Preparing Visual Instructional Materials*. New York: McGraw-Hill, 1962.

# Color Lifts

Thomas G. Gault

There is a trend toward greater use of the overhead transparency projector for instruction in geography. This instrument is especially effective since it can be used in a lighted classroom with the teacher facing the class in the usual manner.

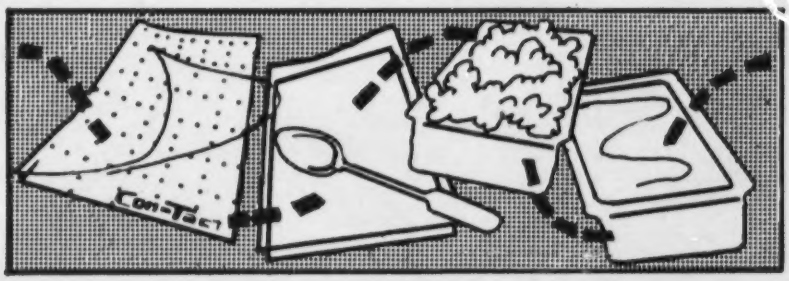
The overhead projector is an extremely versatile teaching tool. It allows the geography instructor to use either single maps or a series of overlays. He may also do freehand drawings on an overlay. Or he may show color pictures without darkening the classroom or using a special daylight screen.

This presentation is concerned with the latter use—transparent color pictures. Many excellent pictures can be found in slick paper magazines. Teachers do not, as a rule, make good use of these colored pictures except for bulletin boards because of 1) limited visibility when shown at the front of the classroom, or 2) disturbances created by circulating the pictures. If these pictures are converted to transparencies they can be enlarged for excellent visibility.

Color transparencies can be made at very low cost with the use of "Con-Tact" kitchen shelf paper. The following is a step-by-step procedure for making them.

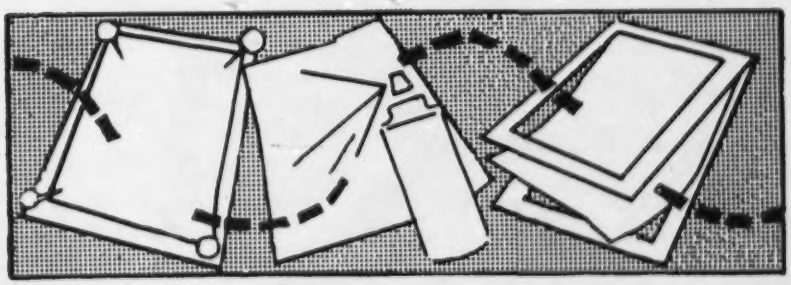
1. Select the picture to be made into a transparency from a slick paper magazine.
2. Purchase some "Transparent Con-Tact" shelf paper. This may be purchased by the yard (49¢) at your local variety store. (If not available at a variety store, the home address is: Cohn-Hall-Marx Co., Division of United Merchants and Manufacturers, Inc., 40 West 40th Street, New York, New York 10018. There probably are other usable brands.)
3. Remove the picture from the magazine and select the portion to be used (approximately 10" by 10") and cut the remainder away.
4. Cut a square of "Con-Tact" paper slightly larger than the picture. (At this point the "Con-Tact" paper and its backing should be left together).
5. Place picture face up on a smooth surface (such as kitchen counter).
6. Peel the "Con-Tact" paper from the backing, being careful not to let it accidently touch the picture. (Keep finger prints out of the area

THOMAS G. GAULT is chairman of the department of geography, Indiana State University, Indiana, Pennsylvania 15701. Previous articles written by Dr. Gault have appeared in the *Journal of Geography, Southeastern Geographer, Pennsylvania Geographer,* and *Proceedings of the Pennsylvania Academy of Science.*



of "Con-Tact" to be over the picture, as they will show in the finished product.)

7. Carefully place the "Con-Tact" paper (sticky side) on the picture so that no wrinkles occur. (Remember, wherever the "Con-Tact" film touches first it will adhere and cannot be removed. Putting the "Con-Tact" on smoothly is the most difficult step in the process.)
8. Using a smooth object, such as a plastic ice scraper for windshields, back of a spoon, or a slightly warm iron, rub from center outward, removing all air bubbles. (Any grayish areas indicate the presence of air between the "Con-Tact" and picture. Any air remaining prevents the "Con-Tact" from adhering to the ink.)
9. Two trays or basins of water are needed (a two-basin sink is perfect). To one basin add one-half teaspoon of liquid detergent, such as Joy, Ivory, Lux, etc. Leave the other basin of water, clear, or clear running water is even better.
10. Place picture and "Con-Tact" in the soapy water and leave a short time (about two minutes) or until the picture paper *peels off the "Con-Tact" easily*. The picture paper will now be blank and may be discarded.
11. Place the "Con-Tact" paper, now with the picture, into the sink of clear water. Wash carefully, using "kleenex" for carefully rubbing the picture under water. *Do not use a rough towel. Rinse until all the whitish (clay) material is removed from the sticky side.* Results can be determined by removing the picture from the water and letting it drain for a minute to see if the white material is all gone. (Be careful *not to lay the "Con-Tact" sticky side down on anything* at this stage, as it will adhere immediately. And remember to keep finger prints out of the picture area.)
12. Hang the "Con-Tact" transparency with sticky side out on cardboard or brown paper over a bulletin board for the purpose of drying. (Straight pins work fine for hanging.)
13. When completely dry and clear of whitish material (may be rewashed if necessary), the transparency is ready to be sprayed. Obtain an aerosol can of liquid plastic, which may be purchased at a variety store, paint store, or hardware store. Spray the picture *lightly* from a 10" to 12" distance. Allow it to dry five minutes and spray *lightly* again. Feel lightly for stickiness (remembering that finger prints show). If any stickiness occurs, spray lightly again.
14. When all stickiness is covered, the transparency is ready to be mounted on a frame.



# Homemade Movies in the Classroom

Mary Ellen Kolka

There is a strong case to support the use of films in the elementary school, especially if they are planned by the children.

Homemade movies lend themselves to a variety of imaginative learning experiences. While commercial films have a definite place in the classroom, so do homemade films. Commercial films are generally concerned with those experiences and topics which are not readily at hand. A homemade film, however, can utilize local resources, which possibly are quite unique to this region of the country.

In an era of inexpensive movie cameras and projectors, the average teacher might already own the necessary equipment for film making. Prices for adequate camera equipment begin at approximately $20.00. Expense can be kept low. A ten-minute movie, including the purchase of film, developing, and splicing, costs about $15.00. Procedures while filming, such as plane rental for aerial shots, could increase the cost by another $12.00 or $15.00.

The filming must be carefully planned in advance. The teacher may choose to film the movie, or the students may do it with the teacher serving only as a technical director. (Because I favor student participation, the following description discusses the latter method.) Students should study thoroughly the topic they plan to film. It is helpful to divide the class into groups, each being made responsible for a specific aspect of the filming operation. A field trip preliminary to the "shooting" is vital so that each group may gather information. The filming of an industry, for example, will require the gathering of information relative to the assembly of raw materials, processing, packaging, and marketing.

The selection of precise scenes to be shot is an important consideration. Action should be an item of vital concern, otherwise one may as well use slides. If action scenes are not apparent at first, imaginative ways in which to bring in movement present the class with a challenging problem to solve.

One group might work on sound effects. Many schools now have tape recorders, some of which are transistor equipped and easy to move from place to place. The effectiveness of the finished film can be greatly increased by dubbing in taped sound effects.

When the preliminary field trip has yielded the information desired, the next step is to return to the classroom and write the script. Each study group re-

lates its findings and contributes them in a logical sequence.

Also, at this point in the development, each group decides definitely what scenes will be filmed. A committee is chosen to accompany the teacher back to the field trip site to do the actual filming.

After the movie scenes have been developed and spliced in correct sequence, the script is added. The script, carefully synchronized with the appropriate scenes, may be read aloud while the film is being shown.

However, the script may be put on tape, and sound effects made at the scene of filming may be coordinated with the narrative. One student, several good readers, or the teacher may tape narrative segments or the entire narrative.

## SKILLS DEVELOPED

The skills developed by movie making, in addition to the first hand knowledge gained from exploring the topic, are:

a) Inter- and intra-group cooperation
b) Good interview techniques and accurate note taking
c) Library and other data source utilization
d) Good listening
e) Movie camera and tape recorder operation
f) Idea organization and writing
g) Dealing with primary sources

Subjects which could be filmed successfully are practically unlimited. The imaginative teacher, along with his students, could select from many possibilities. The following ideas either have been or could be used for filming homemade movies.

Film a cranberry bog (Wisconsin or Massachusetts). The movie could consist of short sequences made during each season of the year. It would show the cranberries during their growth period, harvesting, and processing. Finally, a "dramatic" ending could reveal an array of finished products, from cranberry juice to "crandy bars."

Another interesting topic might be "from peanuts to peanut butter."

A catfish farm has possibilities for film study. Breeding ponds, problems related to diseased fish, feeding the fish, keeping the ponds healthy, harvesting the fish, and marketing the fish could be filmed. An aerial view of the ponds would be impressive.

Land use lends itself to effective filming. Time lapse shots taken at short intervals throughout the year could show the development of crops and other vegetation during each season.

A dramatic and meaningful film study could involve time lapse photography of cloud formations.

Other regional possibilities for movie making could be citrus fruit raising, iron mining, cattle ranching, oil drilling, cheese making, cotton growing, and Christmas tree farming. It is apparent that one no sooner suggests an idea when another one comes to mind.

Movie making for educational purposes incorporates the use of technological advances that lend themselves well to the teaching of geography. Movie making stimulates the child's appetite for learning, develops enthusiasm, and encourages him to see and learn with a more systematic and succinct perspective.

MARY ELLEN KOLKA is a sixth grade teacher at Centennial School, Lawrence, Kansas 66044. She assisted in the Summer Institute for Elementary School Teachers of Geography at the University of Kansas during the past two summers and attended the NDEA National Special Media Institute held at Michigan State University, East Lansing, February 6-10, 1967.

# Aerial Photographs in Secondary Schools

Richard Silvernail

The direct observation of the landscape and its representation on aerial photographs and symbolization on maps are two of the most valuable vehicles for communicating geographical concepts. Unfortunately, most secondary schools and many institutions of higher education rely on only one of these vehicles—the small scale map. This heavy dependence upon the small scale map tends to overemphasize the development of geographic concepts in the abstract. The study of aerial photographs combined with associated field experiences can facilitate understanding of such geographic phenomena as the spatial extension of suburban growth, location of agricultural land and industrial complexes, and the distribution of various landform types. Regardless of the location of a given school, its local environment will contain a variety of specific phenomena which can be used to demonstrate general geographic concepts. This article a) presents a hypothetical land use situation and b) outlines a field exercise, using aerial photography as a vehicle for problem solving.

## DEVELOPING THE CONCEPT OF LAND USE CHANGE

Assume a secondary school located in a suburban area. A class in world regional geography will discuss the growth of urban centers sometime during the semester. The teacher wishes to develop the concept of urban-suburban development. It is recognized that wherever urban centers develop, the resulting increase in value of land contiguous to the urban areas is often associated with land use change. This phenomenon occurs in both "developed" and "underdeveloped" economies. The only variable is usually the degree of land use change.

The teacher would like to show his class both the quantitative and qualitative measures of this process of land use change. Set within the limits of his present educational situation, the local environment can serve as an excellent laboratory. Most teachers have seen the process taking place. In many cases the student has not, but if he has, he has not recognized or appreciated it as a dynamic process and the speed at which it is taking place. Too often the student's only experience with such a process is the reminiscing of his parents or perhaps his teacher with statements such as, "When I was young, that part of town was all farm land, or swamp, or forest." Thus, the major objectives in this exercise are to identify the process and to appreciate the speed at which land use change may occur.

RICHARD SILVERNAIL is an associate professor of geography at the University of South Carolina, Columbia 29208. Dr. Silvernail's research specialties are Resource Use, Physical Geography, and Field Techniques. In addition to his extensive college teaching experience, he has taught for three years in secondary schools.

**Procedure**

Prior to the class discussion of land use change conditioned by urban growth, the students will plot their residences on a large scale road map of the local county. The outline of the region occupied by their residences will delineate the general study area from which the field samples for the exercise will be chosen. At this point the teacher must use care in delimiting the specific study area. He must select a section of relatively recent suburban growth. Next on the agenda is a visit to the county offices of either the Soil Conservation Service or the Agricultural Stabilization and Conservation Service. These offices have index sheets of aerial photograph coverage for the county and order forms for photograph purchases. The index sheets are small scale mosaics of individual aerial photographs.

The general study area should be outlined on the index sheets and a record should be made of the individual classification numbers of the photographs related to the delimited area. The teacher then allows the students to draw at random a selected number of the listed photographs for future study.

Photographs are then ordered (allow at least 2-4 weeks for delivery). The teacher should try to obtain aerial photographs taken at least ten or more years ago, since they provide greater contrast than those taken in the recent past. A suitable size photograph for this exercise is a 9″ × 9″ contact print with a scale of one inch to 1667 feet. Each photograph includes approximately nine square miles of area.

When the class reaches the urban growth part of the course, the teacher can then set the exercise into operation. A simple classification scheme may be devised to take care of gross land use types, i.e., C for all varieties of agricultural land; R for residential area; I for industrial areas; F for forest. This is not an exhaustive breakdown and it may be modified or expanded to meet the local situation.

The class is then divided into field study groups of 2-4 students and each group is given an aerial photograph, usually one taken close to their residences. Since 9 square miles is a sizable area, only a part of the photograph may be used, or one photograph may be divided into several parts with a different work group assigned to each part. The students will be able to identify the land use at the time the photograph was taken. The students do not mark on the aerial photograph, but they are given a sheet of clear acetate (about .075 inches thick) to place over the photograph, and then both are placed on a clipboard. If the teacher needs assistance in air photograph interpretation, he can invite the county soil conservationist to his class to lead a discussion on air photograph interpretation.

The field exercise can be assigned as homework to be done over a weekend. The study group goes to the assigned area and proceeds to map (or record) the present land use on an acetate overlay. The acetate will accept grease pencil, colored pencil, regular soft lead pencil, or ink. When the acetate mapping is completed, the student returns to class and a base map is traced from the aerial photograph. The outlines of the past land uses and their classification are put on the tracing-paper map. Next they will construct a similar base map from the aerial photograph and will map the present land use classifications on it.

**Follow Up**

At this point the student has in hand a number of facts which the teacher can use to help identify relationships. He may encourage a discussion of the

amount of change between the two time periods represented on the maps, the type of change involved, and the relative speed of the change. Students should be able to make comparisons with other areas of the county, state, or nation. Data for these comparisons are available in the agricultural census publications. The teacher may be able to lead the students to discover the relationships between past use and the elements of the physical environment, such as drainage and land forms, or the impact of cultural phenomena on the changing scene, such as zoning laws. Future problems resulting from land use change and suburban growth might be discussed and related to the local situation. The high school mathematics teacher might talk about problems of inference from the given sampling procedure. In addition, the concept of scale can be developed easily.

Similar exercises can be designed to suit other environments. Rural students can utilize school bus routes to record agricultural change along their routes of travel. Urban students can investigate occupance of flood plains or changes in types of land use along major transport arteries. The initial per pupil cost for exercises of this nature may seem high—approximately $1.50. However, the aerial photographs, with reasonable handling, can be used many times and the acetate can be washed clean with soapy water and reused.

## A BRIEF BIBLIOGRAPHY ON EDUCATIONAL MEDIA


PSYCHOLOGY–METHODOLOGY

Bloom, B. S., ed. *Taxonomy of Educational Objectives.* Handbook 1: Cognitive Domain. New York: David McKay Co., 1956.

Bruner, Jerome. *The Process of Education.* Cambridge: Harvard University Press, 1960.

Krathwohl, D. R., B. S. Bloom, and B. B. Masia. *Taxonomy of Educational Objectives.* Handbook 2: Affective Domain. New York: David McKay Co., 1964.

Smith, Karl U., and Margaret F. Smith. *Cybernetic Principles of Learning and Educational Design.* New York: Holt, Rinehart and Winston, 1966.

PROGRAMED INSTRUCTION

Mager, Robert F. *Preparing Instructional Objectives.* San Francisco: Fearon Publishers, 1962.

Schramm, W. *Programmed Instruction Today and Tomorrow.* New York: Fund for the Advancement of Education (Ford Foundation), 1962.

TELEVISION

Diamond, Robert M. *A Guide to Instructional Television.* New York: McGraw-Hill, 1964.

SCHOOL BUILDINGS

"Media's Influence on School Design," *Audiovisual Instruction,* Volume 10, No. 2 (February, 1965)

"Tremors in the Ivory Tower," *Audiovisual Instruction,* Volume 8, No. 4 (April, 1963).

*Educational Facilities with New Media.* Washington, D.C.: Department of Audiovisual Instruction, National Education Association, 1966.

COPYRIGHT LAWS

*Report #2237 on Copyright Law Revision.* Washington, D.C.: U. S. Government Printing Office, 1966.

# Use of the Gemini Slides

Wayne R. White

Since the creation of the National Aeronautics and Space Administration, and especially since the commencement of the Gemini Project, a number of agencies have produced a great variety of visual materials taken on the Gemini flights. They are admirably suited for geographic instruction. These materials include all of the standard motion picture and slide sizes, still photographs of the former, and descriptive narratives.* Each of these, depending on the topic of discussion, can be utilized selectively in interesting and informative presentations.

This article suggests some possible uses of the colored Gemini slides. No attempt is made to compare them with the conventional aerial photographs or slides. Rather, the major purpose is to examine their virtues in geographic education.

### Some Major Concepts Which Can Be Presented

A broad concept which can be presented by most Gemini slides is that of the three "spheres"—the geosphere, the hydrosphere, and the atmosphere, and their interactions. In scenes involving all three, the processes implied in terms such as the following become quite obvious—indraft, windward, condensation, orographic, humid, leeward, arid, and deserts. Cloud formations, densities, and directions of movement are usually easily observed and interpreted, and their relations to global patterns suddenly become real and alive. At larger scales, produced by images taken at lower altitudes, other types of information can be observed and discussed.

Because the Gemini slides encompass large areas, several well-defined spatial variations in the patterns of vegetation, landforms, and drainage systems may suggest cause-effect relationships to climatic patterns. From such observations and associations, the concept of the homogeneous physical region can be translated into reality much better than is normally accomplished by several hours of conventional oral instruction. Students can usually determine the general location of the scene with some degree of accuracy.

A third major concept that can be developed by the use of these slides involves the relation of generalization and scale. By comparing a Gemini slide with an aerial photograph of the same area, a

* A catalog of films may be secured from NASA, Manned Spacecraft Center, Houston, Texas 77058. A list of slides and still pictures of various sizes and a price list can be obtained from Creative Arts Studio, Inc., 814 H. Street NW, Washington, D. C. 20001. This latter firm commercially produces these materials under contract with NASA.

Wayne R. White is an assistant professor of geography at Eastern Kentucky University, Richmond 40476. He has been active locally and statewide in geographic education and research.

student can observe that at various scales some phenomena are visible and others are not. Also, a student can see that only gross generalizations appear in the Gemini slides. For example, in the clearest slide of the Ssu-ch'uan Basin, with a population of approximately 65,000,000 people, no manifestation of man's presence can be observed.

Another concept that can be developed through the use of Gemini slides is the earth's sphericity. In classroom situations, when the curvature of the horizon is to the right, left, or bottom of the screen (even though the slide is properly projected), students invariably tilt their heads in direction of the curvature.

**Specific Examples of Use**

One of the more interesting uses of the Gemini slides is to arrange them in the sequence of a lift-off from Cape Kennedy and a trip around the earth. The slides are available in sufficient quantity and variety that such an experience can be provided with numerous slides or with relatively few. Because of the orientation of the Gemini flights, the slides available fall within relatively narrow latitudinal limits. Consequently, any trip must be generally equatorial instead of polar.

Slide sequences can also be arranged to present changes in gross regional characteristics (for example, a series taken above North Africa) for the presentation of a particular topic. A well-prepared narrative integrated with any of the sequences can become an informative and meaningful experience for students.

A Gemini slide can also be used as a "map." By carefully analyzing the slides, one can be chosen to illustrate some particular element or relationship better than a wall map. If the slide is projected onto some material such as cardboard, cardboard covered by mylar or Char-Tex, then any type of information can be drawn onto the projected image to illustrate various regional concepts.

The slides from the Gemini Project can also be highly useful in testing and evaluating either individual students or large groups of students.

# Quality Control in Graphics

Philip B. Larimore

Seldom has any teaching method or technique been accepted by teachers and experienced such rapid growth in a shorter period of time than has audiovisual presentation. While this is especially true for the overhead projector, it is also true of most other A-V media. Technical innovations, better projection equipment, and improved and varied materials are but some of the reasons for this "media explosion." Of equal importance is the fact that today most teachers are being trained to use these materials to improve their classroom presentations. It has been proven that the use of media increases the speed of learning and the retention of information. Furthermore, teachers need help. The "explosion of knowledge" and the increase in number of students has made the efficient use of new instructional media imperative.

The overhead projector is but one of these "new media," but one of the better ones. The advantages gained by using transparencies and the "up front" teaching station have been cited in many publications, so there need be no further discussion here. Today the ratio of one teacher to one overhead projector is well accepted by most principals and administrators. Many schools now have one overhead in every classroom and many others are working toward this goal. Those teachers who use the overhead with regularity find it to be one of the greatest time-savers and one of the most meaningful teaching aids to be introduced in many years. Instruction in the use of the overhead, for those who do not feel secure in its operation, can be obtained in most college or university audiovisual education courses, from sales representatives of media-producing companies, or in NDEA and NSF sponsored institutes. Some of the latter are either completely oriented toward media, and most have a portion of their programs devoted to the preparation and presentation of media.

Those teachers working with overheads know that with all of the advantages there is still considerable work involved in the proper preparation of material. There are many devices that will allow rapid transfer of material to transparencies. Unfortunately, there is still a great disparity in the quality of visuals produced by the various copying machines. Before you buy, compare! There are systems which will allow copying directly from a book onto a transparency in four or five seconds. This type of transparency, while produced rapidly, does have certain disadvantages. Most maps, charts, or graphs in texts do not have lettering designed for projection. It is gen-

PHILIP B. LARIMORE is director of the Cartography-Media Laboratory, School of Geology, Louisiana State University, Baton Rouge 70803. He has taught a course in "Audio-Visual Geography for Teachers" in two NDEA Summer Institutes in Geography at LSU.

erally much too small to be legible on the screen. Because of printing costs, many maps in books are designed for multiple purposes and make use of either color or tones to aid in reading comprehension. When these graphics are reproduced in one color and projected, they tend to confuse rather than aid the viewer. Too much material is projected on the screen at one time to be readily understood. Information in individual projectuals should be kept to a minimum and additional data can be presented either on overlays or on additional transparencies. In visual presentation, it is desirable to present new information slowly and in small increments. When done in this manner, there is assurance that it will be understood and retained.

The preparation of transparencies takes time, knowledge, and a fair amount of equipment. The more sophisticated projectuals require more knowledge of graphic production and more expensive equipment. But of the three factors, time is the one item seemingly in shortest supply today. It is little comfort to tell a teacher that extra time spent making transparencies this year will mean time saved in the future. Though true to a degree, the teacher knows better, for next year will bring a myriad of other things to be done.

One might answer this problem by purchasing prepared material. Today, all media journals and many of the professional publications are filled with advertisements offering all types of prepared material for teaching. To the average person with little knowledge of media production, or the time or desire to learn, this seems to be the answer to a prayer. But before spending the school's money, keep in mind that prepared media have certain limitations.

Commercial material often does not fit the teaching methods of individual instructors. Some questions should be asked before you purchase. Does the medium present its information in an accustomed manner? Does it use terms or concepts that are unfamiliar to you or your students, or that you do not want to use because they are not pertinent to your method of presentation? And, if you purchase a set of transparencies, will it be feasible to spend considerable time rewriting your unit to fit them?

In their rush to get material on the market, some companies have produced transparencies or masters containing incorrect information.* For example, it is obvious that no competent physical geographer was allowed to edit one set of geography masters now on the market and, because of this oversight, many of the physical features were incorrectly identified or drawn. This same set makes use of terms not considered proper today. Few available sets would pass the critical eye of a professional geographer with regard to technical quality. Many sets have such small lettering that, when projected on the screen it is not legible for most students, even from the front of the room. One company sells a bound set of maps on acetate (a projectable atlas) for about one hundred dollars. The maps seem to be photographic copies of the company's published wall maps. The lettering, when projected on the screen, is not visible from any distance. Many maps in this same set have poor color values for projection purposes. Some of the colors used actually reduce legibility. The company points out that each student should have a desk atlas (available at a modest extra cost) so that he does

* The twenty-one geographers attending the NDEA Special Media Institute at Michigan State University, East Lansing, Michigan (February 6-10, 1967), were highly critical of most commercial transparencies. The group recommends that teachers who detect errors in projectuals, filmstrip captions, maps, etc., convey their opinions to the publisher. Only through this type of professional censure can we insure better quality in the future.

not *have* to be able to read every word on the screen! In this case, why buy the transparencies?

**Important Qualities in Transparencies**

A good transparency *must* be able to stand alone. Every word on the projectual should be legible to *everyone* in the room. If any of the words cannot be read, then the lettering is too small. Colors are added for emphasis or for delineation or separation. If color is used just to make the picture "pretty," it is useless as a teaching tool. The transparency is projected on the screen to introduce information and to aid in the teaching-learning process. Color is important, but only as an aid in presentation. If color increases the aesthetic value, so much the better, but this property is secondary.

Still another company has available a set of prepared color transparencies on American History. This set was edited by a historian and is factually more correct than most (even if the Gadsden Purchase was omitted on the transparency depicting the westward expansion of the United States). The company attempted to reduce costs by having four to six overlays on each frame. This set has so much information that the publishers found it necessary to include a book of directions on how to use each projectual. A teacher, to make use of this material, must study the guide in detail and follow it carefully. Far too much information is presented in too little space. Having too much information presented at one time tends to confuse the viewer and, at the same time, makes the transparency more difficult for the teacher to use.

In conclusion, the commercial companies were quick to move into a lucrative field. They know that too many teachers simply lack the time to prepare their own material. Time, in many instances, is a more critical factor than money. It is important to remember that not everything published and presently available is good. The selection is up to the individual teacher and/or media supervisor. Request, in fact, demand that you be allowed to see the full set of material that interests you. Use this material for a short time in your classroom. Check data to make certain it is correct. See that information, as presented on the projectuals, is suited to your course presentation, or that you would be able to alter your presentation to fit the visuals. Make sure the printing is legible on the screen from any point in the room. If color is used, see if it helps increase understanding or adds emphasis. Determine if the methods of presentation are, or can be made, clearly understandable to you and your students. If you have satisfied yourself on these points, then and only then will your money be wisely spent. The same critical analysis of quality should be given to maps, film-strips, slide sets, single-concept films, and all other types of visual material you plan to purchase. Don't take for granted that all materials available on the market have accurate content or good visual properties, regardless of the reputation of the company producing them.

If transparencies and other media are correct, well done, and fit your methods of presentation, then you will have material for more pleasurable and effective teaching. It will then become apparent how visual presentation can help you teach new and more complicated information faster than before and still have your students truthfully say, "Now I see!"

# Bibliography of *Journal* Articles on Educational Media 1956-1966

Salvatore J. Natoli

This bibliography on educational media was selected from the last ten volumes of the *Journal of Geography*. It indicates the sustained interest of the *Journal* in improving geographic education. This special media issue, therefore, simply continues and hopefully epitomizes the *Journal's* efforts to respond to teachers' needs in keeping abreast of advances in classroom media and techniques.

## CLASSROOM TECHNIQUES AND IDEAS

Anderson, Thomas G., and Kennamer, Lorrin, Jr. "Geography Poster—A Way to Review," LV, 8 (Nov. 1956), 388-389.

Cook, Katherine, and Vodicka, Edward M. "Question and Answer Board Promotes Effective Geographic Concept Building," LVII, 9 (Dec. 1958), 468-469.

Delaney, Arthur A. "Blotter Erosion," LVIII, 3 (March 1959), 141-143.

———. "The Geographic 'Crossword Puzzle'", LX, 1 (Jan. 1961), 24-25.

Greco, Peter V. "Objectifying Statistics: The Hythergraph," LXIV, 5 (May 1965) 205-210.

Heimonen, Henry S. "A Laboratory Exercise in Aerial Photo Interpretation," LVI, 6 (Sept. 1957), 286-290.

Henzl, Sister Joseph Maria, S.N.J.M. "Lesson Along the Highway," LXIV, 6 (Sept. 1965), 268-270.

Hill, Raymond T. "Postage Stamps: A Useful Teaching Aid," LV, 3 (March 1956), 144-148.

Hillenberg, Franklin L. "A Model Farm: A Third Grade Project," LXII, 8 (Nov. 1963), 375.

Hoffman, Hazel Ward. "Using a Flannelgraph in Book Reports," LIX, 3 (March 1960), 136-138.

SALVATORE J. NATOLI is a geography specialist with the Social Sciences Branch of the Division of Educational Personnel Training, U. S. Office of Education, Washington, D.C. 20202. His research speciality is urban geography. He had extensive college and university teaching experience prior to joining the U. S. Office of Education.

Jacobson, Daniel. "The Georama—An Aid in Geographical Motivation," LVII, 9 (Dec. 1958), 464-467.

Kuester, Sharon. "Starch and Detergent Relief Models," LVIII, 1 (Jan. 1959), 44-45.

Lokke, Donald. "Clouds Portrayed in Cotton," LXII, 7 (Oct. 1963), 323-324.

——. "Teaching Clouds and Weather by Using a Shadow-Box," LXI, 4 (April 1962), 169-170.

Resnick, Abraham. "Teacher-Made Study-Aids Can Vitalize the Elementary Textbook," LXII, 9 (Dec. 1963), 419-422.

Smith, James R. "Bulletin Boards in Geography," LVIII, 6 (Sept. 1959), 301-303.

Stapleton, Peggy. "Observation Conservation," LVII, 5 (May 1958), 257-260.

Taylor, Harris M. "The Use of Problem Solving Groups in Teaching Geography," LIX, 4 (April 1960), 187-188.

Warman, Henry J. "How to Make a Relief Model Quickly," LVI, 6 (Sept. 1957), 253-256.

Wills, Bernt Lloyd. "Coffee Can Aneroid Barometer," LIX, 9 (Dec. 1960), 421-422.

Zufelt, David L. "Two Dimensional Graph Enlargement," LVII, 8 (Nov. 1958), 416-417.

### CHARTS

Castelli, Joseph R. "A Flow Chart for Climate Classification," LXIII, 1 (Jan. 1964), 19-22.

Flierl, Howard H. "A Movable Date Line Chart," LXII, 4 (April 1963), 175-176.

Macomber, Lenore. "Suggestions on Preparing a Movable Date Line Chart," LXIII, 5 (May 1964), 222-223.

### EXHIBITS

Bounds, John H. "A Geography Exhibit for a Science Fair," LXII, 7 (Oct. 1963), 317-319.

James, Linnie B. "How to Prepare and Evaluate Materials for Student Exhibits," LVIII, 5 (May 1959), 251-254.

### FIELD TRIPS

Taylor, James W. "The Air Field Trip," LIX, 5 (May 1960), 225-228.

Teske, Alfred E. "Geography Field Trips Via Colored Slides," LVIII, 7 (Oct. 1959), 334-339.

Thomas, Robert N. "An Extended Geography Field Trip," LX, 1 (Jan. 1961) 16-19.

Young, Robert N. "Notes on a Program of Field Mapping for Undergraduates," LV, 3 (March 1956), 149-151.

## FILMS AND FILM STRIPS

Gregor, Howard F. "Slide-Projection Techniques in the Geography Class," LV, 6 (Sept. 1956), 298-302.

Gritzner, Charles F., Jr. "The Geographical Filmstrip: A Neglected Teaching Aid in Higher Education," LXIV, 3 (March 1965), 105-109.

Harris, W. N. "Using Motion Pictures to Illustrate Certain Aspects of Economic Geography," LXIII, 2 (Feb. 1964), 72-73.

Kelland, Frank and Marylin. "Techniques for Taking Colored Geographic Slides" LVI, 3 (March 1957), 109-116.

Phillips, Mary Viola. "The Effective Use of Filmstrips in Teaching Geography at the High School Level," LVII, 2 (Feb. 1958) 70-74.

Smith, David A. " 'Home Movies' in the Geography Classroom," LIX, 2 (Feb. 1960), 87-90.

Thomas, Alan K., and Raup, H. F. "Photography for the Geography Teacher," LV, 5 (May 1956), 243-246.

Trussell, Edith. "The Opaque Projector as a Teaching Aid," LV, 9 (Dec. 1956), 425-428.

## INSTRUCTIONAL MATERIALS

Gandy, Willard E. "Instructional Patterns and Materials in the Teaching of Geography," LXIV, 2 (Feb. 1965), 72-76.

Guest, B. Ross. "Free and Inexpensive Aerospace Materials for the Classroom," LXII, 3 (March 1963), 112-116.

Switzer, W. J. "The Selection of Basic Teaching Aids for a Secondary School World Geography Course," LXI, 8 (Nov. 1962), 363-366.

## GLOBE AND MAP SKILLS

Allen, Dwight W. "Beginning a Map Study With Myth," LVII, 9 (Dec. 1958), 459-463.

Arnsdorf, Val E. "Teaching Map-Reading and Geographic Understandings with Projectuals," LXIII, 2 (Feb. 1964) 75-81.

Bahn, Catherine I. "Moon Maps," LVIII, 2 (Feb. 1959), 98-102.

———. "Plastic Maps and Globes," LIX, 1 (Jan. 1960), 41-44.

Bathurst, Leonard H. "Developing Map Reading Skills," LX, 1 (Jan. 1961), 26-31.

Chace, Harriett. "Using Maps in Teaching History," LIX, 8 (Nov. 1960), 380-384.

Christophel, Edna. "Checking Map-Reading Skills in the Elementary Grades," LX, 6 (Sept. 1961), 285-286.

Dahlberg, Richard E. "Maps Without Projections," LX, 5 (May 1961), 213-217.

Delaney, Arthur A. "Making a Contour Map Model," LXI, 7 (Oct. 1962) 310-312.

Goble, James. "Magic Map," LX, 6 (Sept. 1961), 283-285.

Goodman, Marie Cleckner. "Recent Maps of Interest to Teachers of Geography: IV," LV, 5 (May 1956), 227-235. See also Jan. 1952, March 1953 and Dec. 1954 issues.

Goodman, Marjorie Smith. "A 'Do-It-Yourself' Map Projector," LXII, 6 (Sept. 1963) 272-273.

Hazel, Joseph A. "Most 'Good' Maps Do Not Have a Directional Symbol," LXIV, 2 (Feb. 1965), 81-82.

Henzl, Sister Joseph Maria. "Global Time Out," LXI, 9 (Dec. 1962), 415-416.

Hess, Maynard. "Recipe for a Pàpier-Màché Relief Map," LVIII, 9 (Dec. 1959), 457.

Hirt, Howard F. "Reducing Distortion: A Useful Approach in Augmenting the Understanding of Map Projections," LIX, 7 (Oct. 1960), 308-313.

Hoefer, John N., and Hassemer, Bernard G. "State Study Thru Map Interpretation," LVII, 1 (Jan. 1958), 13-16.

Hoffman, Hazel Ward. "The Map Comes Alive," LV, 2 (Feb. 1956), 77-79.

Kennamer, Lorrin, Jr. "An Experiment in Map Reading," LXIII, 9 (Dec. 1964), 427-428.

———. "Visualization of Latitude and Longitude," LXI, 1 (Jan. 1962), 9-11.

Kingsbury, Robert C. "The World of Little Maps," LXIII, 8 (Nov. 1964), 355-366.

McAulay, J. D. "Game Maps for the Social Studies in the Elementary School," LVIII, 5 (May 1959), 246-250.

McCarthy, Albert J. P., and Randall, Maurice D. "A Teaching Unit on the Rectangular Land Survey," LIX, 8 (Nov. 1960), 360-363.

McKinney, William M. "Experimental Proofs of the Earth's Rotation," LXI, 4 (April 1962), 171-174.

Miller, E. Joan. "Making Land Utilization Maps: Work in the Field with Nine-Year Olds," LVIII, 4 (April 1959), 195-198.

Montgomery, Katherine, and Baxter, Eugenia. "The Geography Notebook: A Purposeful Activity," LVII, 1 (Jan. 1958), 41-43.

Resnick, Abraham. "Merging Map, Man and Media in the Elementary Social Studies Program," LXII, 4 (April 1963), 170-174.

Robertson, Dolyne. "The Globe as a Geography Tool," LV, 1 (Jan. 1956), 35-36.

Rodyenko, Peter. "Three-Dimension Model Illustrates Reading Relief by Contour Lines," LVII, 2 (Feb. 1958), 78-82.

Sabaroff, Rose. "Improving the Use of Maps in the Elementary School," LX, 4 (April 1961), 184-189.

———. "Maps and Mapping in the First Grade," LVIII, 9 (Dec. 1959), 445-450.

———. "Using Maps in the Second Grade," LVII, 8 (Nov. 1958), 410-415.

Villmow, Jack R. "Daily Weather Maps as Illustrations of Weather Types: Part One," LVII 9 (Dec. 1958), 454-458.

———. "Daily Weather Maps as Illustrations of Weather Types: Part Two," LIX, 2 (Feb. 1960), 73-75.

## PROGRAMED LEARNING

McAulay, J. D. "The Place of Programmed Learning in Elementary School Geography," LXI, 5 (May 1962), 215-221.

Shafer, Susanne M. "Geography Via Programed Instruction," LXIV, 2 (Feb. 1965), 77-80.

## TELEVISION

Christensen, D. E. "Experimenting with Geography Teaching by Television," LXIV, 2 (Feb. 1965), 59-63.

———. "Overhead Projector Use in Televising Geography," LXIII, 7 (Oct. 1964), 319-322.

Cramer, Robert E. "College Geography Over Closed-Circuit Television," LX, 4 (April 1961), 172-179.

Haupert, John S. "Televising Political Geography," LIX, 3 (March 1960), 127-131.

Hill, Raymond T. "Maps for Television Use," LXI, 5 (May 1962), 204-208.

Warman, Henry J. "Telecasting Techniques in Geography," LV, 5 (May 1956), 217-226.

## FILMS

"Africa," LXIII, 5 (May 1964), 226.

"Air and Atmosphere," LXII, 4 (April 1963), 180.

"Andean Countries," LXIII, 3 (March 1964), 128.

"Brazil, The Amazon Basin," LXI, 6 (Sept. 1962), 274.

"The City," LVIII, 8 (Nov. 1964), 379.

"Cotton and Corn," LXI, 5 (May 1962), 223-224.

"Ecology," LXIII, 4 (April 1964), 179.

"Europe," LXIII, 9 (Dec. 1964), 426.

"France," LXII, 5 (May 1963), 216.

"Geomorphology," LXI, 8 (Nov. 1962), 377.

"Japan," LXII, 3 (March 1963), 129.

"Japan," LXIII, 7 (Oct. 1964), 329.

"Maps and Globes," LXII, 6 (Sept. 1963), 271.

"Metropolitan Planning," LXI, 4 (April 1962), 176.

"Population 'Explosion'," LXII, 2 (Feb. 1963), 80.

"Southeast Asia," LXII, 7 (Oct. 1963), 320-321.

"Southern Europe," LXIII, 1 (Jan. 1964), 37.

"Space Exploration," LXII, 9 (Dec. 1963), 423.

"The United States," LXII, 1 (Jan. 1963), 33.

"U.S. Agriculture," LXIII, 6 (Sept. 1964), 279.

"Water Conservation," LXI, 7 (Oct. 1962), 326.

"Weather," LXIII, 2 (Feb. 1964), 86.

# Sources of Information on Educational Media

Alfreda M. Liebermann

## GENERAL INDEXES AND GUIDES

*Educational Media Index.* Education's most comprehensive, annotated listing of films, filmstrips, pictures, phonotapes and disks, slides, video tapes, kits, charts, and programed materials. Alphabetized and subject indexed.

Complete set includes 14 volumes:

Vol. 1—Pre-School and Primary, Grades K-3.
Vol. 2—Intermediate, Grades 4-6.
Vol. 12—Geography and History.
Vol. 14—Master Title Index.

A Project of the Educational Media Council under a contract from the U. S. Office of Education. McGraw-Hill Book Co., New York, N.Y. 10036. 1964.

*Guide to Programed Instruction Materials Available to Educators by Sept. 1963.* Center for Programed Instruction, Government Printing Office, Washington, D.C. 20401. 1963.

ALFREDA M. LIEBERMANN is an education specialist in the Geography Section of the Social Sciences Branch of the Division of Educational Personnel in the U. S. Office of Education. Miss Liebermann received her geography training from the University of Maryland and served two years in the Peace Corps in Sierra Leone before joining the U. S. Office of Education.

*Guides to Newer Educational Media, Films, Filmstrips, Phono-Records, Radio, Slides, and Television* by Margaret Rufsvold and Carolyn Guss. Handbook describing available catalogs, lists, services, professional organizations, journals, and periodicals which regularly provide information on newer educational media. American Library Association, 50 East Huron Street, Chicago, Illinois 60611. 1961.

*Instructional Materials*, Illinois Curriculum Program. Office of the Superintendent of Public Instruction, Springfield, Illinois 62706. 1961.

"Instructional Materials: Educational Media and Technology," James D. Finn and William H. Allen. *Review of Educational Research*, XXXII (April 1962) 115-221.

*Instructional Materials for Teaching Audiovisual Courses.* An annotated list of motion pictures, kinescopes, filmstrips, slide sets, recordings, and tapes. Syracuse University, Audiovisual Center, Box 87, University Station, Syracuse, N.Y., 13210, in cooperation with the U. S. Department of Health, Education, and Welfare, Office of Education.

*Selected Audiovisual Source and Reference List.* Division of Audiovisual Instructional Services, National Education Association, Washington, D.C. 20036. 1964.

*Selected Bibliography of Related Resources.* Carolyn I. Whitenack. Appears as a foreword to the several volumes of the Educational Media Index (see above).

*Sources of Information on Educational Media.* John A. Moldstad for the Educational Media Council in cooperation with the U. S. Department of Health, Education, and Welfare. Government Printing Office, Washington, D.C. 20401. 1963.

*Teacher Education and Media*, A Selective, Annotated Bibliography. Desmond T. Wedberg, Teacher Education and Media Project, American Association of Colleges for Teacher Education, Washington, D.C. 1964.

**PERIODICALS**

*Audio-Visual Communication Review.* Quarterly and special issues. Department of Audiovisual Instruction, National Education Association, 1201 16th St., N.W., Washington, D.C. 20036.

*Audiovisual Instruction.* Periodic listing of sources of evaluation. Monthly except August. Department of Audiovisual Instruction, NEA, 1201 16th St., N.W., Washington, D.C. 20036.

*Business Screen.* Published at six-week intervals. Comprehensive annotation and suggested use of films and filmstrips, largely sponsored. 7064 Sheridan Road Bldg., Chicago, Illinois 60626.

*Educational Screen and Audiovisual Guide.* Monthly evaluation of films and filmstrips. Educational Screen, Inc., 415 N. Dearborn, Chicago, Illinois. 60605.

*Educational Television Newsletter.* Quarterly. Committee on Television, American Council on Education, Washington, D.C.

*Film News.* Monthly reviews and suggested use for films and filmstrips. Film News Co., 250 W. 57th St., New York, N.Y. 10019.

*Film World and AV News Magazine.* Monthly. Sidale Publishing Co., Los Angeles, California.

*NAEB Journal.* Published bimonthly. National Association of Educational Broadcasters, 119 Gregory Hall, Urbana, Illinois 61801.

*NET News.* Four times a year, National Educational Television and Radio Center, New York, N.Y.

*Teaching Aid News.* Published semi-monthly. Educational News Service, P.O. Box 508, Saddle Brook, N.J. 07662.

## FREE AND INEXPENSIVE MATERIALS

"Bibiography of Bibliographies of Free and Inexpensive Learning Aids." P. R. Chiddell. *Curriculum Bulletin,* XVII, 216 (October 1961).

*Directory of Information Resources in the United States.* National Referral Center for Science and Technology, 1965.

*Educators Guide to Free Films.* Educators Progress Service, Box 497, Randolph, Wisc. 53956. Revised annually. Annotated list of sponsored materials for classroom use. Other titles in the series include: *Educators Guide to Free Filmstrips, Educators Guide to Social Studies Materials, Educators Guide to Free Tapes, Scripts and Transcriptions.*

*Elementary Teachers Guide to Free Curriculum Materials.* Revised annually. Educators Progress Service, Randolph, Wisc. 53956.

*Free and Inexpensive Learning Materials,* 12th ed., Division of Surveys and Field Service, George Peabody College for Teachers, Nashville, Tennessee 37203. 1962.

## FILMS AND FILMSTRIPS

*Catalog 1965 Educational Motion Pictures,* Audio-Visual Center, Indiana University, Bloomington, Indiana 47401. 1965.

*Directory of 16-mm. Educational Film Depositories.* Lists a large number of film libraries, some of which limit their circulation to a designated area. *Suggested Sources of Recordings for Educational Use and United States Government Films for Public Use* are revised occasionally. Recently the latter edition catalogs more than 5,000 educational films on a variety of subjects, available for public or private use. United States Office of Education, Washington, D.C. 20202.

*Educational Film Guide,* 11th ed., 5-year cumulated supplement, 1954-1958. Annual supplements, 1959, 1960, and 1961. H. W. Wilson Co., New York, N.Y. 1953.

*EFLA Evaluations.* Continuing 3 × 5 card service. Describes, rates, and suggests uses for films. Published monthly since 1948. Cumulative index. Educational Film Library Association, 250 W. 57th St., New York, N.Y. 10019.

*Films for Libraries* prepared by a subcommittee of the ALA Audio-Visual Committee. Graded, annotated list of approximately 400 selected 16-mm films. 1963. 92 pp. American Library Association, 50 E. Huron St., Chicago, Illinois 60611.

*Filmstrip Guide,* 3rd ed., 4-year cumulated supplement 1955-1958. Annual supplements 1960-1962. H. W. Wilson Co., New York, N.Y. 1954.

*Landers Film Reviews.* Bertha Landers, editor. Monthly except July and August. Descriptive and evaluative annotations of current film on loose-leaf sheets. Landers Associates, 4930 Coliseum St., Los Angeles, California 90016.

*Library of Congress Catalog: Motion Pictures and Filmstrips.* Published quarterly, with annual and quinquennial cumulations. Library of Congress, Washington, D.C. 20203. 1953.

*U. S. Government Films for Public Educational Use—1963.* Seerley Reid, Katherine W. Clugston, for the U. S. Department of Health, Education and Welfare. Government Printing Office, Washington, D.C. 20401.

## TELEVISION

*Instructional Television Materials: A Guide to Films, Kinescopes, and Videotapes Available for Televised Use.* An annotated list of selected courses. 3rd ed. National Instructional Television Library, New York, N.Y. 1964.

*Selected Bibliography on Instructional Television.* Richard H. Dewey. Ampex Corporation, Redwood City, California. 1963.

*Television and Education: A Bibliography.* Television Information Office, New York, N.Y., December 1960.

## RECORDINGS

*Audio Cardalog.* Max U. Bildersee, editor. 10 issues, 400 cards. Continuing service which, through sets of printed cards, describes, evaluates, suggests use, provides purchasing information, and catalog disc and tape recordings. The Cardalog, Box 989, Larchmont, New York 10538.

*Building Your Record Library.* Roy H. Hoopes, Jr., editor. McGraw-Hill Book Co., 330 W. 42nd Street, New York, N.Y. 10036. 1956.

*Children's Record Reviews.* Published five times a year since October 1957, Box 192, Woodmere, New York, N.Y. 11598.

*Library of Congress Catalog: Music and Phonorecords.* Published semi-annually with annual and quinquennial cumulations. Library of Congress, Washington, D.C. 1953.

*National Tape Recording Catalog.* Department of Audiovisual Instruction, National Education Association, Washington, D.C., 20036. 1962. Supplement 1964.

*Recordings for Children.* Prepared by the New York Library Association, Children's and Young Adult Services Section. A selected list of spoken and music records arranged by age level and subject. Office of Children's Services. The New York Public Library, New York, N.Y. 1964.

## PREPARATION OF VISUALS

*Display for Learning: Making and Using Visual Materials.* Marjorie East. Dryden Press, New York, N.Y. 1952.

*Simplified Techniques for Preparing Visual Materials.* Edward O. Minor. McGraw-Hill Brook Co., Inc., New York, N.Y. 10036. 1962.